FCC RF Test Report

APPLICANT	: Xiaomi Communications Co., Ltd.
EQUIPMENT	: Mobile Phone
BRAND NAME	: Redmi
MODEL NAME	: 22041219G
FCC ID	: 2AFZZ1219G
STANDARD	: 47 CFR Part 2, 22, 27
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	: Feb. 13, 2022 ~ Mar. 14, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG211901C	Rev. 01	Initial issue of report	Mar. 17, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power (5G NR n5)	ERP < 7 Watt		
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n7, n41, n38)	EIRP < 2Watt		
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a)	Conducted Band Edge Measurement (5G NR n5)	< 43+10log10(P[Watts])	PASS	-
	§27.53(m)(4)	Conducted Band Edge Measurement (5G NR n7, n41, n38)	§27.53(m)(4)		
3.8	§2.1051 §22.917(a)	Conducted Spurious Emission (5G NR n5)	< 43+10log10(P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (5G NR n7, n41, n38)	< 55+10log$_{10}$(P[Watts])		
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a)	Radiated Spurious Emission (5G NR n5)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 22.13 dB at 7576.00 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (5G NR n7, n41, n38)	< 55+10log$_{10}$(P[Watts])		

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.2 Manufacturer

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Redmi
Model Name	22041219G
FCC ID	2AFZZ1219G
IMEI Code	Conducted : 868424060022301/868424060022319 Radiation: N/A
HW Version	P2
SW Version	MIUI 13
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz
Rx Frequency	5G NR n5 : 869 MHz ~ 894 MHz 5G NR n7 : 2620 MHz ~ 2690 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz
Bandwidth	**For SCS 15kHz:** n5, n7, n38: 5MHz / 10MHz / 15MHz / 20MHz n41: 10MHz / 15MHz / 20MHz / 40MHz / 50MHz **For SCS 30kHz:** n5, n7, n38: 10MHz / 15MHz / 20MHz n41 : 10MHz / 15MHz / 20MHz / 40MHz / 50MHz / 60MHz / 80MHz / 90MHz / 100MHz
Antenna Gain	**<Ant. 1>** n5: -6.13 dBi n7: -1.64 dBi n38: -1.64 dBi

	n41: -1.64 dBi **<Ant. 4>** n5: -4.56 dBi n7: -3.08 dBi n38: -3.08 dBi n41: -3.08 dBi **<Ant. 2>** n7: -0.25 dBi n38: -0.25 dBi n41: -0.25 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

The maximum ERP/EIRP is calculated from max output power and max antenna gain, only the maximum ERP/EIRP are shown in the report, 5G NR n7 for Antenna 4 and 5G NR n5/n38/n41 for Antenna 1.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power and Emission Designator

For SCS 15kHz:

5G NR n7 SA		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2510.0 ~ 2560.0	0.2163	19M4G7D	0.1633	19M3W7D
5G NR n38 SA		**PI/2 BPSK / QPSK**		**16QAM / 64QAM / 256QAM**	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5	2572.5 ~ 2617.5	0.2642	4M50G7D	0.2104	4M49W7D
20	2580 ~2610	0.2655	18M2G7D	0.1959	18M3W7D
5G NR n41 SA		**PI/2 BPSK / QPSK**		**16QAM / 64QAM / 256QAM**	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
50	2521.005 ~ 2664.99	0.4656	48M1G7D	0.3296	48M3W7D

For SCS 30kHz:

5G NR n5 SA		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
20	834.0 ~ 839.0	0.0483	19M3G7D	0.0369	19M3W7D
5G NR n41 SA		**PI/2 BPSK / QPSK**		**16QAM / 64QAM / 256QAM**	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
100	2546.01 ~ 2640.00	0.4786	97M1G7D	0.2877	97M5W7D

Note:

1. 5G NR Band n41 overlaps the entire frequency range of Band n38. Therefore, the conducted test results provided in this report covers Band n41 as well as Band n38.
2. All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22, 24, 27
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y Plane) were recorded in this report.

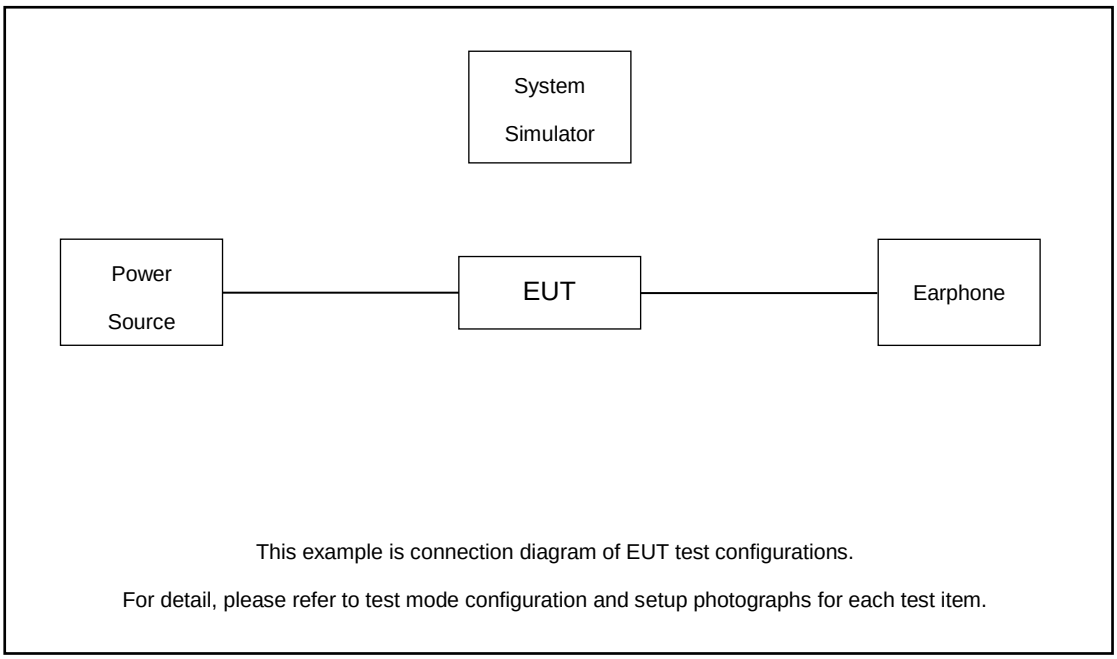
The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

	X Plane	Y Plane	Z Plane
Orthogonal Planes of EUT			

Test Items	5G NR	Bandwidth (MHz)								Modulation					RB #		Test Channel		
		5	10	15	20	40	50	60-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n5	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n7	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n38	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	n5				v	-	-	-	-	v	v	v	v	v		v		v	
	n7				v	-	-	-	-	v	v	v	v	v		v		v	
	n38	v				-	-	-	-	v	v	v	v	v		v		v	
	n41	-					v		v	v	v	v	v	v		v		v	
26dB and 99% Bandwidth	n5				v	-	-	-	-	v	v					v		v	
	n7				v	-	-	-	-	v	v					v		v	
	n38	v				-	-	-	-	v	v					v		v	
	n41	-			v		v		v	v	v					v		v	

Test Items	5G NR	Bandwidth (MHz)								Modulation					RB #		Test Channel		
		5	10	15	20	40	50	60-90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Conducted Band Edge	n5	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v		v
	n7	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v		v
	n38	v				-	-	-	-	v	v	v	v	v	v	v	v		v
	n41	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v		v
Conducted Spurious Emission	n5	v	v	v	v	-	-	-	-		v				v		v	v	v
	n7	v	v	v	v	-	-	-	-		v				v		v	v	v
	n38	v				-	-	-	-		v				v		v	v	v
	n41	-	v	v	v	v	v	v	v		v				v		v	v	v
Frequency Stability	n5				v	-	-	-	-		v					v		v	
	n7				v	-	-	-	-		v					v		v	
	n38	v				-	-	-	-		v					v		v	
	n41	-			v		v				v					v		v	
E.R.P / E.I.R.P	n5	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n7	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n38	v	v	v	v	-	-	-	-	v	v	v	v	v	v	v	v	v	v
	n41	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n5	Worst Case																v	
	n7	Worst Case																v	
	n41	Worst Case																v	
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All modulations (BPSK/QPSK/16QAM/64QAM/256QAM) have been tested, and only the worst test results are shown in the report . 5. Frequency Stability：Normal Voltage = 3.87V；Low Voltage =3.6V.；High Voltage =4.45V																		

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
3.	Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded,1.8m
4.	Earphone	MI	EM023	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 4.7 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 4.7 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n5 Channel and Frequency List for SCS 15kHz/30kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	175800	176300	176800
	Frequency	834	836.5	839
15	Channel	175300	176300	177300
	Frequency	831.5	836.5	841.5
10	Channel	174800	176300	177800
	Frequency	829	836.5	844
5	Channel	174300	176300	178300
	Frequency	826.5	836.5	846.5

5G NR n7 Channel and Frequency List for SCS 15kHz/30kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	526000	531000	536000
	Frequency	2510	2535	2560
15	Channel	525500	531000	536500
	Frequency	2507.5	2535	2562.5
10	Channel	525000	531000	537000
	Frequency	2505	2535	2565
5	Channel	524500	531000	537500
	Frequency	2502.5	2535	2567.5

5G NR n38 Channel and Frequency List for SCS 15kHz/30kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	516000	519000	522000
	Frequency	2580	2595	2610
15	Channel	515500	519000	522500
	Frequency	2577.5	2595	2612.5
10	Channel	515000	519000	523000
	Frequency	2575	2595	2615
5	Channel	514500	519000	523500
	Frequency	2572.5	2595	2617.5

5G NR n41 Channel and Frequency List for SCS 15kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
50	Channel	504201	518601	532998
	Frequency	2521.005	2593.005	2664.99
40	Channel	503202	518601	534000
	Frequency	2516.01	2593.005	2670
20	Channel	501201	518601	535998
	Frequency	2506.005	2593.005	2679.99
15	Channel	500700	518601	536499
	Frequency	2503.5	2593.005	2682.495
10	Channel	500202	518601	537000
	Frequency	2501.01	2593.005	2685

5G NR n41 Channel and Frequency List for SCS 30kHz				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	509202	518598	528000
	Frequency	2546.01	2592.99	2640
90	Channel	508200	518598	528996
	Frequency	2541	2592.99	2644.98
80	Channel	507204	518598	529998
	Frequency	2536.02	2592.99	2649.99
60	Channel	505200	518598	531996
	Frequency	2526	2592.99	2659.98
50	Channel	504204	518598	532998
	Frequency	2521.02	2592.99	2664.99
40	Channel	503202	518598	534000
	Frequency	2516.01	2592.99	2670
20	Channel	501204	518598	535998
	Frequency	2506.02	2592.99	2679.99
15	Channel	500700	518598	536496
	Frequency	2503.5	2592.99	2682.48
10	Channel	500202	518598	537000
	Frequency	2501.01	2592.99	2685

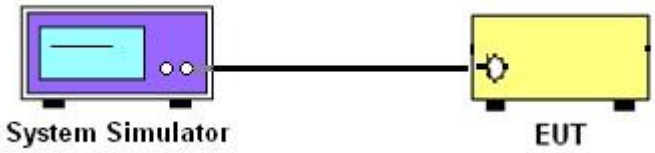
3 Conducted Test Items

3.1 Measuring Instruments

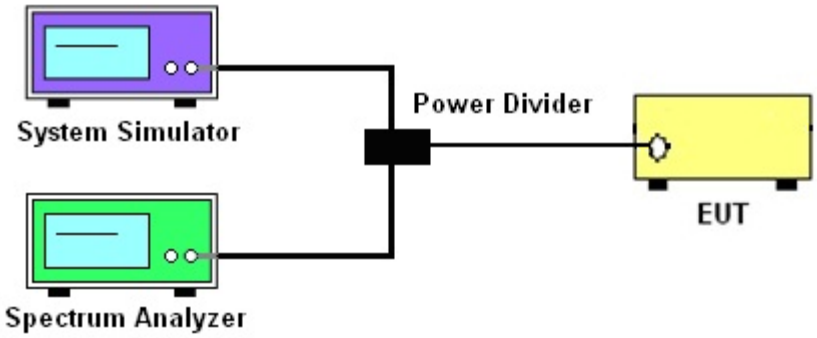
See list of measuring instruments of this test report.

3.2 Test Setup

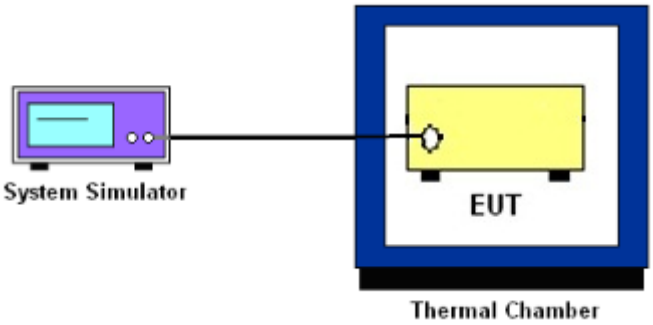
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for 5G NR n5.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n7, n38 and n41.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is 43 + 10log$_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For 5G NR n7/n38/n41, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n7/n38/n41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For 5G NR n7/n38/n41
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

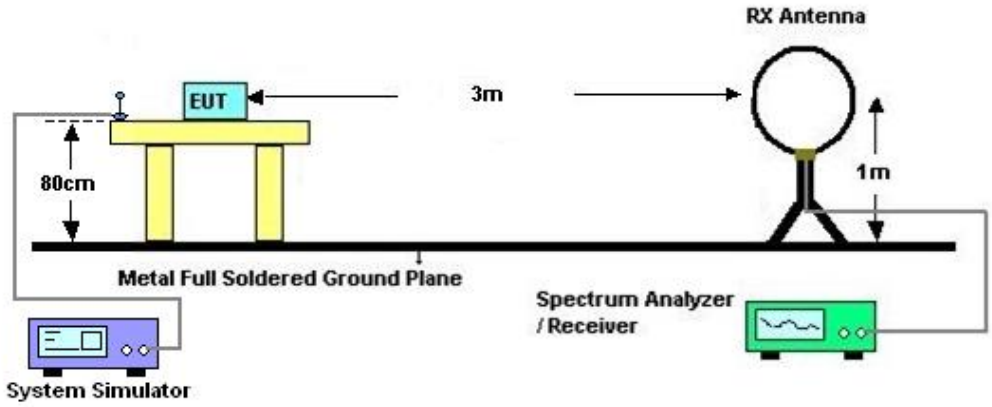
4 Radiated Test Items

4.1 Measuring Instruments

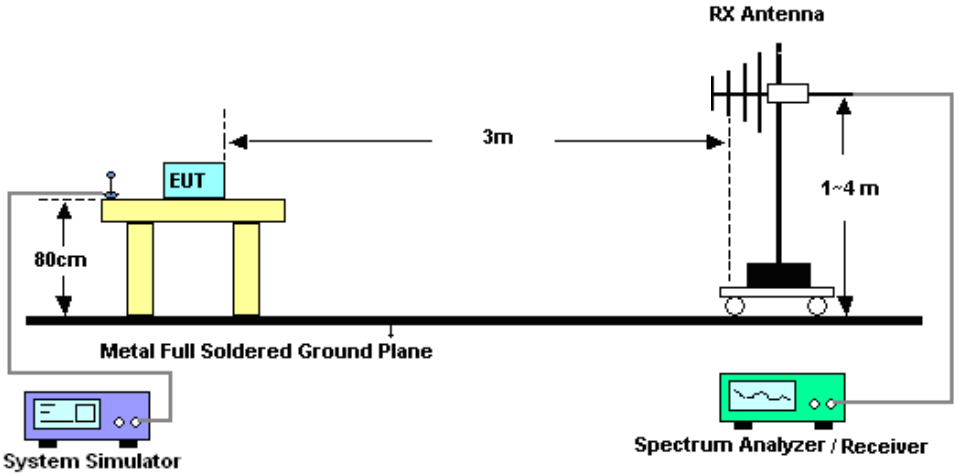
See list of measuring instruments of this test report.

4.2 Test Setup

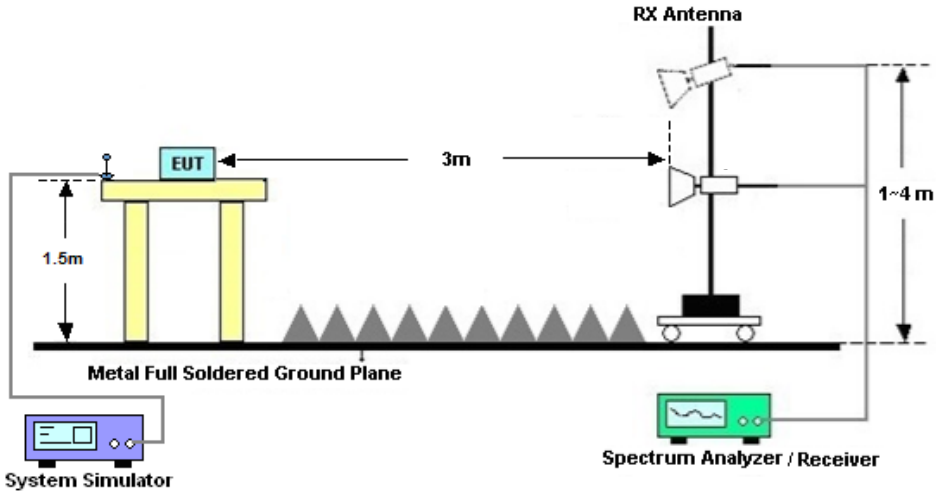
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For 5G NR n7/n38/n41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For 5G NR n7/n38/n41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Feb. 13, 2022 ~ Mar. 14, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Feb. 13, 2022 ~ Mar. 14, 2022	Aug. 25, 2022	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Feb. 13, 2022 ~ Mar. 14, 2022	Jul. 11, 2022	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 16, 2021	Feb. 15, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 16, 2021	Feb. 15, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Feb. 15, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 22, 2021	Feb. 15, 2022	Dec. 21, 2022	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct.. 30, 2021	Feb. 15, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Feb. 15, 2022	Jul. 29, 2023	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Feb. 15, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 13, 2021	Feb. 15, 2022	Apr. 12, 2022	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Feb. 15, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Feb. 15, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Feb. 15, 2022	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 15, 2022	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 15, 2022	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.5dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.1dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.1dB**

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23℃
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and ERP/EIRP

For 5G NR n5(15kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				166800	167300	167800				
Frequency (MHz)				834	836.5	839		L	M	H
20	PI/2 BPSK	1	1	24.73	24.80	24.65	-6.13	0.0442	0.0449	0.0434
20	QPSK	1	1	24.83	24.95	24.63	-6.13	0.0452	0.0465	0.0432
20	QPSK	1	53	25.07	25.03	24.75	-6.13	0.0478	0.0473	0.0444
20	QPSK	1	104	24.73	24.67	24.86	-6.13	0.0442	0.0436	0.0455
20	QPSK	50	0	24.00	24.06	23.75	-6.13	0.0373	0.0378	0.0352
20	QPSK	50	28	25.01	24.95	24.83	-6.13	0.0471	0.0465	0.0452
20	QPSK	50	56	23.89	23.96	23.85	-6.13	0.0364	0.0370	0.0361
20	QPSK	100	0	23.82	24.09	23.89	-6.13	0.0358	0.0381	0.0364
20	16QAM	1	1	23.77	23.90	23.82	-6.13	0.0354	0.0365	0.0358
20	64QAM	1	1	22.34	22.43	21.47	-6.13	0.0255	0.0260	0.0208
20	256QAM	1	1	20.53	20.59	20.01	-6.13	0.0168	0.0170	0.0149
Channel				166300	167300	168300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	QPSK	1	1	24.73	24.58	24.61	-6.13	0.0442	0.0427	0.0430
15	16QAM	1	1	23.85	23.82	23.69	-6.13	0.0361	0.0358	0.0348
Channel				165800	167300	168800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	QPSK	1	1	24.67	24.63	24.64	-6.13	0.0436	0.0432	0.0433
10	16QAM	1	1	23.63	23.59	23.52	-6.13	0.0343	0.0340	0.0334
Channel				165300	167300	169300	Gain	ERP	ERP	ERP
Frequency (MHz)				826.5	836.5	846.5				
5	QPSK	1	1	24.89	24.80	24.92	-6.13	0.0458	0.0449	0.0461
5	16QAM	1	1	23.84	23.44	23.90	-6.13	0.0360	0.0328	0.0365

For 5G NR n5(30kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				175800	176300	176800				
Frequency (MHz)				834	836.5	839		L	M	H
20	PI/2 BPSK	1	1	24.58	24.69	24.65	-6.13	0.0427	0.0438	0.0434
20	QPSK	1	1	24.71	24.62	24.72	-6.13	0.0440	0.0431	0.0441
20	QPSK	1	50	24.14	23.73	23.93	-6.13	0.0385	0.0351	0.0367

20	QPSK	1	49	25.12	24.79	24.86	-6.13	0.0483	0.0448	0.0455
20	QPSK	50	0	24.75	23.82	23.92	-6.13	0.0444	0.0358	0.0366
20	QPSK	25	12	24.71	24.83	24.82	-6.13	0.0440	0.0452	0.0451
20	16QAM	1	1	23.92	23.92	23.95	-6.13	0.0366	0.0366	0.0369
20	64QAM	1	1	22.22	22.52	22.23	-6.13	0.0248	0.0265	0.0248
20	256QAM	1	1	19.96	20.02	20.02	-6.13	0.0147	0.0149	0.0149
Channel				175300	176300	177300	Gain	ERP	ERP	ERP
Frequency (MHz)				831.5	836.5	841.5				
15	QPSK	1	1	24.75	24.65	24.65	-6.13	0.0444	0.0434	0.0434
15	16QAM	1	1	23.99	23.99	23.92	-6.13	0.0372	0.0372	0.0366
Channel				174800	176300	177800	Gain	ERP	ERP	ERP
Frequency (MHz)				829	836.5	844				
10	QPSK	1	1	24.69	24.73	24.63	-6.13	0.0438	0.0442	0.0432
10	16QAM	1	1	23.78	24.05	23.93	-6.13	0.0355	0.0378	0.0367

For 5G NR n7(15kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				502000	507000	512000		L	M	H
Frequency (MHz)				2510	2535	2560				
20	PI/2 BPSK	1	1	26.11	25.82	26.10	-3.08	0.2009	0.1879	0.2004
20	QPSK	1	1	25.99	25.22	26.11	-3.08	0.1954	0.1637	0.2009
20	QPSK	1	53	26.35	25.87	25.46	-3.08	0.2123	0.1901	0.1730
20	QPSK	1	104	26.43	25.85	24.02	-3.08	0.2163	0.1892	0.1242
20	QPSK	50	0	25.33	25.31	25.22	-3.08	0.1679	0.1671	0.1637
20	QPSK	50	28	26.21	25.98	25.43	-3.08	0.2056	0.1950	0.1718
20	QPSK	50	56	25.60	25.26	24.70	-3.08	0.1786	0.1652	0.1452
20	16QAM	1	1	25.14	25.21	25.18	-3.08	0.1607	0.1633	0.1622
20	64QAM	1	1	23.66	23.82	23.62	-3.08	0.1143	0.1186	0.1132
20	256QAM	1	1	21.49	22.07	21.52	-3.08	0.0693	0.0793	0.0698
Channel				501500	507000	512500	Gain	ERP	ERP	ERP
Frequency (MHz)				2507.5	2535	2562.5				
15	QPSK	1	1	25.62	26.22	25.87	-3.08	0.1795	0.2061	0.1901
15	16QAM	1	1	25.12	25.28	24.86	-3.08	0.1600	0.1660	0.1507
Channel				501000	507000	513000	Gain	ERP	ERP	ERP
Frequency (MHz)				2505	2535	2565				
10	QPSK	1	1	25.82	25.96	25.95	-3.08	0.1879	0.1941	0.1936
10	16QAM	1	1	24.86	25.06	24.96	-3.08	0.1507	0.1578	0.1542
Channel				500500	507000	513500	Gain	ERP	ERP	ERP
Frequency (MHz)				2502.5	2535	2567.5				
5	QPSK	1	1	26.17	26.31	25.99	-3.08	0.2037	0.2104	0.1954
5	16QAM	1	1	25.26	25.50	25.06	-3.08	0.1652	0.1746	0.1578

For 5G NR n7(30kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	ERP	ERP	ERP
Channel				502000	507000	512000		L	M	H
Frequency (MHz)				2510	2535	2560				
20	PI/2 BPSK	1	1	25.77	25.65	25.99	-3.08	0.1858	0.1807	0.1954
20	QPSK	1	1	25.73	25.96	25.96	-3.08	0.1841	0.1941	0.1941
20	QPSK	1	50	25.02	24.85	24.93	-3.08	0.1563	0.1503	0.1531
20	QPSK	1	49	25.92	25.72	25.26	-3.08	0.1923	0.1837	0.1652
20	QPSK	50	0	24.96	25.02	25.24	-3.08	0.1542	0.1563	0.1644
20	QPSK	25	12	25.96	26.13	26.21	-3.08	0.1941	0.2018	0.2056
20	16QAM	1	1	24.58	24.92	24.76	-3.08	0.1413	0.1528	0.1472
20	64QAM	1	1	23.16	23.32	23.39	-3.08	0.1019	0.1057	0.1074
20	256QAM	1	1	21.46	21.45	21.57	-3.08	0.0689	0.0687	0.0706
				501500	507000	512500	Gain	ERP	ERP	ERP
Frequency (MHz)				2507.5	2535	2562.5				
15	QPSK	1	1	25.63	25.86	25.96	-3.08	0.1799	0.1897	0.1941
15	16QAM	1	1	24.56	24.82	25.07	-3.08	0.1406	0.1493	0.1581
Channel				501000	507000	513000	Gain	ERP	ERP	ERP
Frequency (MHz)				2505	2535	2565				
10	QPSK	1	1	25.63	26.03	25.98	-3.08	0.1799	0.1972	0.1950
10	16QAM	1	1	24.58	24.92	24.96	-3.08	0.1413	0.1528	0.1542

For 5G NR n38(15kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				516000	519000	522000		L	M	H
Frequency (MHz)				2580	2595	2610				
20	PI/2 BPSK	1	1	25.63	25.22	25.56	-1.64	0.2506	0.2280	0.2466
20	QPSK	1	1	25.56	25.23	25.52	-1.64	0.2466	0.2286	0.2443
20	QPSK	1	104	25.36	25.58	25.83	-1.64	0.2355	0.2477	0.2624
20	QPSK	50	25	25.62	25.23	25.88	-1.64	0.2500	0.2286	0.2655
20	QPSK	100	0	24.69	24.46	24.83	-1.64	0.2018	0.1914	0.2084
20	16QAM	1	1	24.56	24.13	24.56	-1.64	0.1959	0.1774	0.1959
20	64QAM	1	1	23.11	23.06	23.52	-1.64	0.1403	0.1387	0.1542
20	256QAM	1	1	21.06	20.65	20.96	-1.64	0.0875	0.0796	0.0855
Channel				515500	519000	522500	Gain	ERP	ERP	ERP
Frequency (MHz)				2577.5	2595	2612.5				
15	PI/2 BPSK	1	1	25.63	25.23	25.69	-1.64	0.2506	0.2286	0.2541
15	16QAM	1	1	24.56	24.19	24.76	-1.64	0.1959	0.1799	0.2051
Channel				515000	519000	523000	Gain	ERP	ERP	ERP
Frequency (MHz)				2575	2595	2615				
10	QPSK	1	1	25.38	25.16	25.53	-1.64	0.2366	0.2249	0.2449
10	16QAM	1	1	24.36	24.16	24.41	-1.64	0.1871	0.1786	0.1892
Channel				514500	519000	523500	Gain	ERP	ERP	ERP
Frequency (MHz)				2572.5	2595	2617.5				

5	QPSK	1	1	25.73	25.33	25.86	-1.64	0.2564	0.2339	0.2642
5	16QAM	1	1	24.78	24.32	24.87	-1.64	0.2061	0.1854	0.2104

For 5G NR n38(30kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				516000	519000	522000		L	M	H
Frequency (MHz)				2580	2595	2610				
20	PI/2 BPSK	1	1	25.56	25.12	25.49	-1.64	0.2466	0.2228	0.2427
20	QPSK	1	1	25.65	25.24	25.62	-1.64	0.2518	0.2291	0.2500
20	QPSK	1	26	25.54	25.51	25.65	-1.64	0.2455	0.2438	0.2518
20	QPSK	1	49	25.32	25.60	25.80	-1.64	0.2333	0.2489	0.2606
20	QPSK	25	0	24.68	24.30	24.77	-1.64	0.2014	0.1845	0.2056
20	QPSK	25	13	25.60	25.40	25.64	-1.64	0.2489	0.2377	0.2512
20	QPSK	25	26	24.58	24.68	24.47	-1.64	0.1968	0.2014	0.1919
20	QPSK	50	0	24.62	24.49	24.89	-1.64	0.1986	0.1928	0.2113
20	16QAM	1	1	24.54	24.22	24.55	-1.64	0.1950	0.1811	0.1954
20	64QAM	1	1	23.26	22.66	23.02	-1.64	0.1452	0.1265	0.1374
20	256QAM	1	1	20.85	20.55	20.84	-1.64	0.0834	0.0778	0.0832
Channel				515502	519000	522498	Gain	ERP	ERP	ERP
Frequency (MHz)				2577.51	2595	2612.49				
15	QPSK	1	1	25.73	25.24	25.67	-1.64	0.2564	0.2291	0.2529
15	16QAM	1	1	24.55	24.30	24.51	-1.64	0.1954	0.1845	0.1936
Channel				515004	519000	522996	Gain	ERP	ERP	ERP
Frequency (MHz)				2575.02	2595	2614.98				
10	QPSK	1	1	24.68	24.32	24.98	-1.64	0.2014	0.1854	0.2158
10	16QAM	1	1	23.61	23.23	23.88	-1.64	0.1574	0.1442	0.1675

For 5G NR n41(15kHz):

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				504201	518601	532998		L	M	H
Frequency (MHz)				2521.005	2593.005	2644.99				
50	PI/2 BPSK	1	1	27.72	27.91	27.96	-1.64	0.4055	0.4236	0.4285
50	QPSK	1	1	27.78	28.13	28.06	-1.64	0.4111	0.4457	0.4385
50	QPSK	1	268	27.82	28.06	28.13	-1.64	0.4150	0.4385	0.4457
50	QPSK	135	67	28.16	28.32	28.26	-1.64	0.4487	0.4656	0.4592
50	QPSK	270	0	27.11	27.28	27.31	-1.64	0.3524	0.3664	0.3690
50	16QAM	1	1	26.44	26.62	26.82	-1.64	0.3020	0.3148	0.3296
50	64QAM	1	1	24.85	25.11	25.63	-1.64	0.2094	0.2223	0.2506
50	256QAM	1	1	22.99	23.51	23.35	-1.64	0.1365	0.1538	0.1483
Channel				503202	518601	534000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2516.01	2593.005	2670				
40	QPSK	1	1	27.62	27.83	27.69	-1.64	0.3963	0.4159	0.4027
40	16QAM	1	1	26.18	26.36	26.55	-1.64	0.2844	0.2965	0.3097
Channel				501201	518601	535998	Gain	EIRP	EIRP	EIRP

Frequency (MHz)				2506.005	2593.005	2679.99				
20	QPSK	1	1	26.96	27.03	27.33	-1.64	0.3404	0.3459	0.3707
20	16QAM	1	1	25.63	25.86	25.93	-1.64	0.2506	0.2642	0.2685
Channel				500700	518601	536499	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2503.5	2593.005	2682.495				
15	QPSK	1	1	26.96	27.36	27.06	-1.64	0.3404	0.3733	0.3483
15	16QAM	1	1	25.86	26.12	26.13	-1.64	0.2642	0.2805	0.2812
Channel				500202	518601	537000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2501.01	2593.005	2685				
10	QPSK	1	1	26.93	27.06	27.12	-1.64	0.3381	0.3483	0.3532
10	16QAM	1	1	25.45	26.12	25.82	-1.64	0.2404	0.2805	0.2618

For 5G NR n41(30kHz):

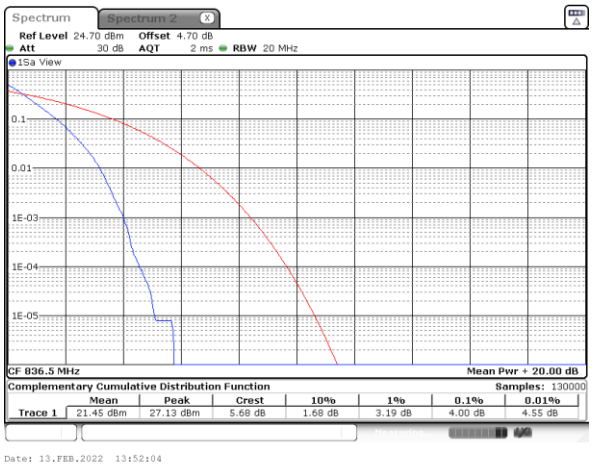
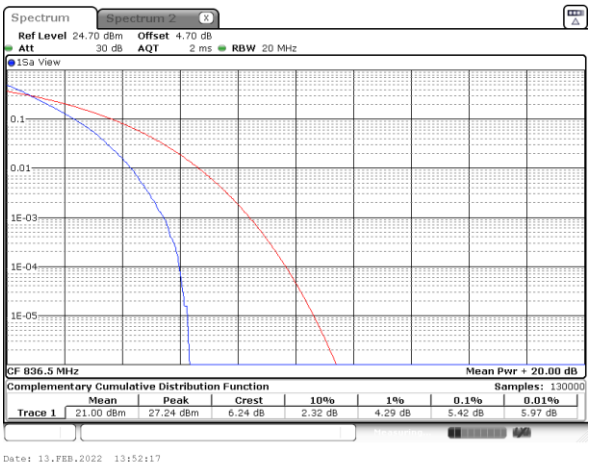
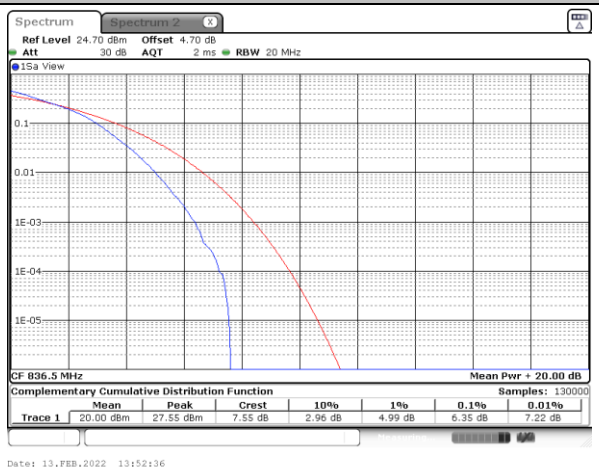
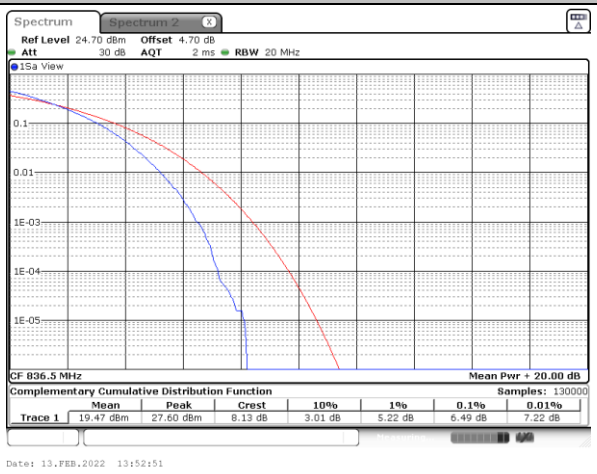
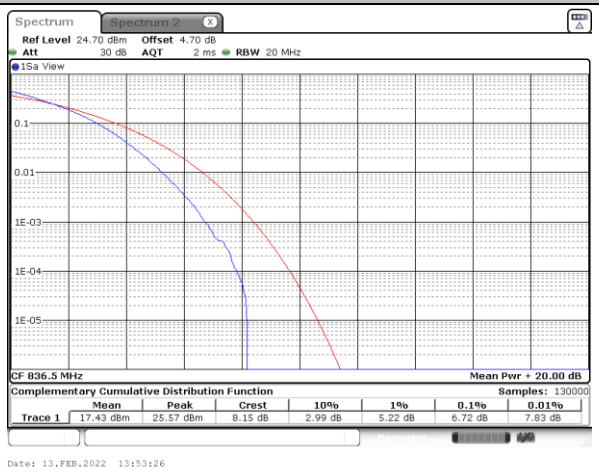
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP	EIRP	EIRP
Channel				509202	518598	528000		L	M	H
Frequency (MHz)				2546.01	2592.99	2640				
100	PI/2 BPSK	1	1	26.96	27.41	27.13	-1.64	0.3404	0.3776	0.3540
100	QPSK	1	1	27.03	27.35	27.12	-1.64	0.3459	0.3724	0.3532
100	QPSK	1	137	28.32	28.12	28.44	-1.64	0.4656	0.4446	0.4786
100	QPSK	1	271	27.41	27.44	27.52	-1.64	0.3776	0.3802	0.3873
100	QPSK	135	0	26.83	27.05	27.13	-1.64	0.3304	0.3475	0.3540
100	QPSK	135	69	28.26	28.23	28.36	-1.64	0.4592	0.4560	0.4699
100	QPSK	135	138	27.12	27.22	27.06	-1.64	0.3532	0.3614	0.3483
100	QPSK	270	0	26.99	27.36	27.11	-1.64	0.3428	0.3733	0.3524
100	16QAM	1	1	26.02	26.23	26.16	-1.64	0.2742	0.2877	0.2831
100	64QAM	1	1	24.56	24.85	24.76	-1.64	0.1959	0.2094	0.2051
100	256QAM	1	1	22.73	23.16	22.77	-1.64	0.1285	0.1419	0.1297
Channel				508200	518598	528996	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2541	2592.99	2644.98				
90	QPSK	1	1	27.22	27.62	27.59	-1.64	0.3614	0.3963	0.3936
90	16QAM	1	1	26.22	26.68	26.69	-1.64	0.2871	0.3192	0.3199
Channel				507204	518598	529998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2536.02	2592.99	2649.99				
80	QPSK	1	1	27.44	27.86	27.83	-1.64	0.3802	0.4188	0.4159
80	16QAM	1	1	26.36	26.98	26.68	-1.64	0.2965	0.3420	0.3192
Channel				505200	518598	531996	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2526	2592.99	2659.98				
60	QPSK	1	1	27.44	27.89	28.02	-1.64	0.3802	0.4217	0.4345
60	16QAM	1	1	26.55	27.22	27.12	-1.64	0.3097	0.3614	0.3532
Channel				504204	518598	532998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2521.02	2592.99	2664.99				
50	QPSK	1	1	27.73	28.05	28.26	-1.64	0.4064	0.4375	0.4592
50	16QAM	1	1	26.85	27.21	27.36	-1.64	0.3319	0.3606	0.3733
Channel				503202	518598	534000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2516.01	2592.99	2670				
40	QPSK	1	1	27.36	27.66	27.88	-1.64	0.3733	0.3999	0.4207

40	16QAM	1	1	26.44	26.72	26.92	-1.64	0.3020	0.3221	0.3373
Channel				501204	518598	535998	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2506.02	2592.99	2679.99				
20	QPSK	1	1	27.72	27.86	27.81	-1.64	0.4055	0.4188	0.4140
20	16QAM	1	1	26.86	26.88	27.03	-1.64	0.3327	0.3342	0.3459
Channel				500700	518598	536496	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2503.5	2592.99	2682.48				
15	QPSK	1	1	28.03	28.03	27.92	-1.64	0.4355	0.4355	0.4246
15	16QAM	1	1	27.06	27.12	27.13	-1.64	0.3483	0.3532	0.3540
Channel				500202	518598	537000	Gain	EIRP	EIRP	EIRP
Frequency (MHz)				2501.01	2592.99	2685				
10	QPSK	1	1	27.85	27.93	27.92	-1.64	0.4178	0.4256	0.4246
10	16QAM	1	1	26.93	27.03	26.99	-1.64	0.3381	0.3459	0.3428

FR1 n5

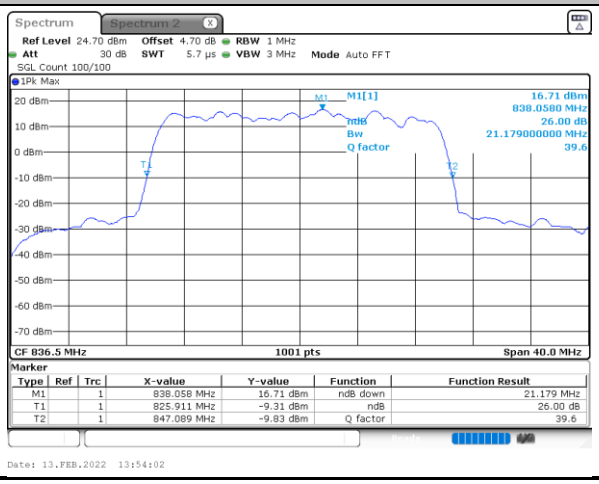
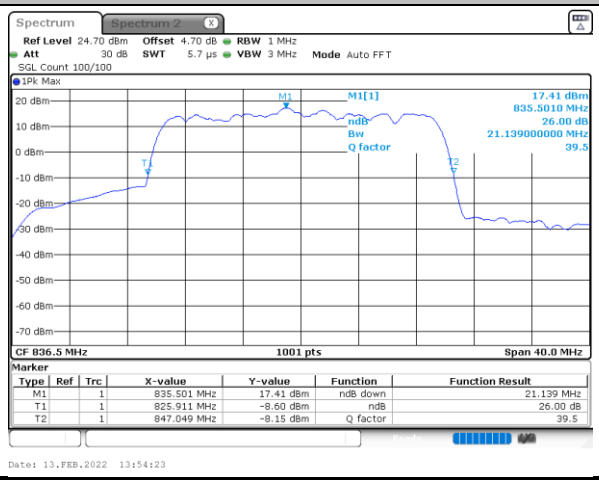
Peak-to-Average Ratio

Mode	FR1 n5 / 20MHz / DFT-S OFDM				
Mod.	PI/2 BPSK	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Full RB	Result
Middle CH	4.00	5.42	6.35	6.49	PASS
Mode	FR1 n5 / 15MHz / DFT-S OFDM				
Mod.	256QAM				Limit: 13dB
RB Size	Full RB				Result
Middle CH	6.72				PASS

FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel / Full RB	**Middle Channel / Full RB**
PI/2 BPSK	**QPSK**
	
16QAM	**64QAM**
	
256QAM	
	

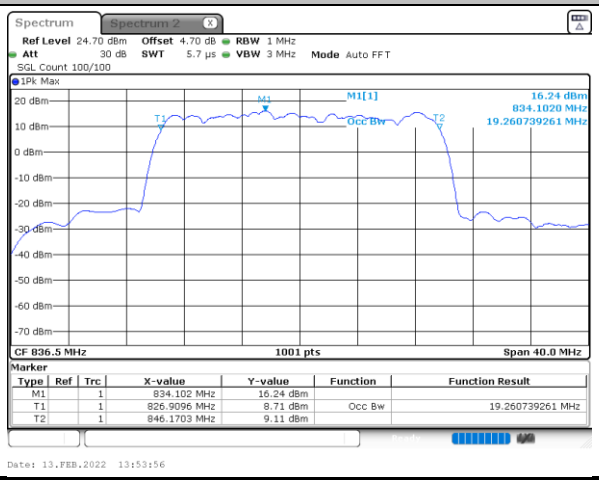
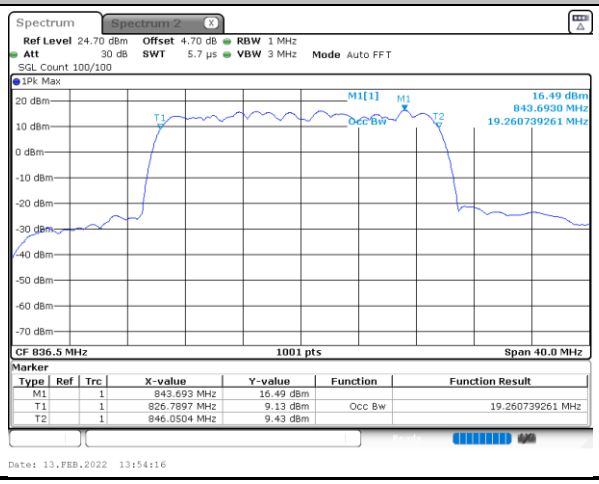
26dB Bandwidth

Mode	FR1 n5: 26dB BW(MHz) / DFT-S OFDM	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	21.18	21.14

FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel	
QPSK	16QAM
	

Occupied Bandwidth

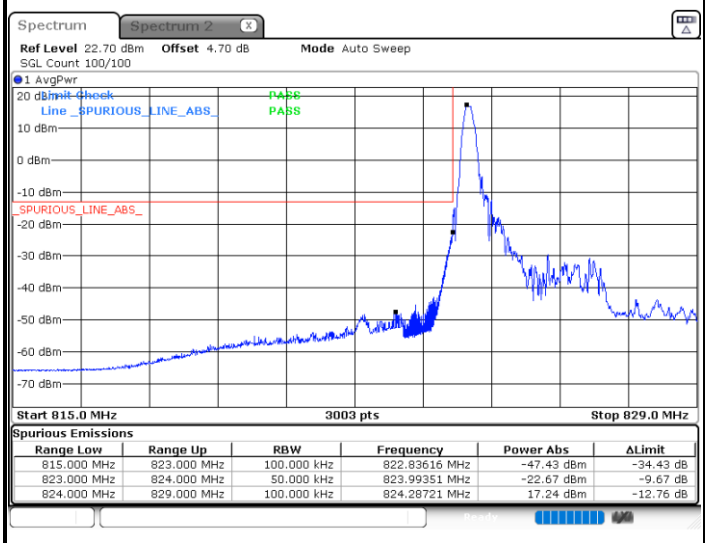
Mode	FR1 n5 : 99%OBW(MHz) / DFT-S OFDM	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	19.26	19.26

FR1 n5 / 20MHz / DFT-S OFDM	
Middle Channel	
QPSK	16QAM
	

Conducted Band Edge

FR1 n5 / 5MHz / DFT-S OFDM / PI/2 BPSK

Lowest Band Edge / 1RB0

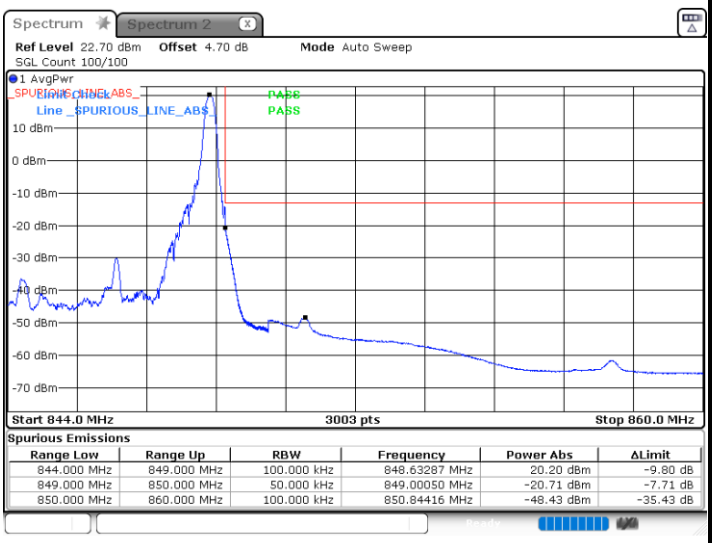


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
815.000 MHz	823.000 MHz	100.000 kHz	822.83616 MHz	-47.43 dBm	-34.43 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.99351 MHz	-22.67 dBm	-9.67 dB
824.000 MHz	829.000 MHz	100.000 kHz	824.28721 MHz	17.24 dBm	-12.76 dB

Date: 13.FEB.2022 12:12:34

Highest Band Edge / 1RBMAX

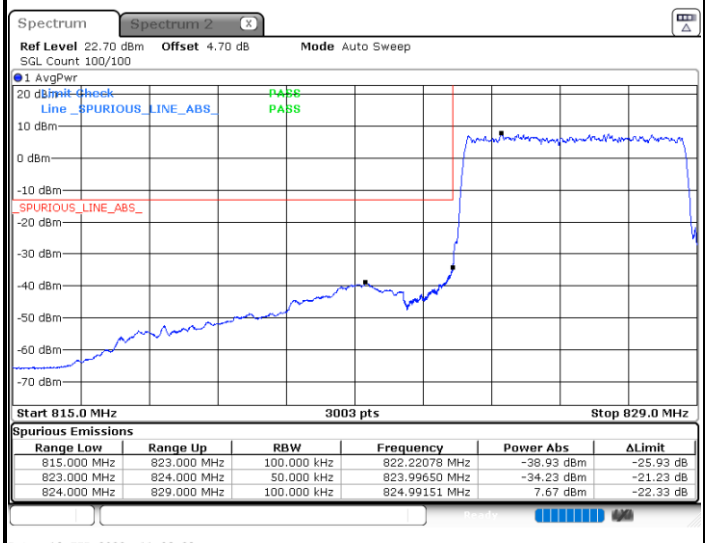


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	848.63287 MHz	20.20 dBm	-9.80 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.00050 MHz	-20.71 dBm	-7.71 dB
850.000 MHz	860.000 MHz	100.000 kHz	850.84416 MHz	-48.43 dBm	-35.43 dB

Date: 13.FEB.2022 12:31:20

Lowest Band Edge / Full RB

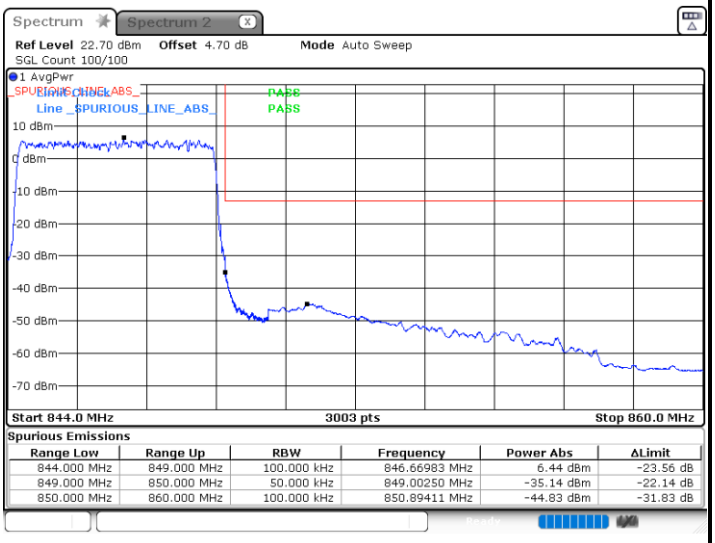


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
815.000 MHz	823.000 MHz	100.000 kHz	822.22078 MHz	-38.93 dBm	-25.93 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.99650 MHz	-34.23 dBm	-21.23 dB
824.000 MHz	829.000 MHz	100.000 kHz	824.99151 MHz	7.67 dBm	-22.33 dB

Date: 13.FEB.2022 11:28:23

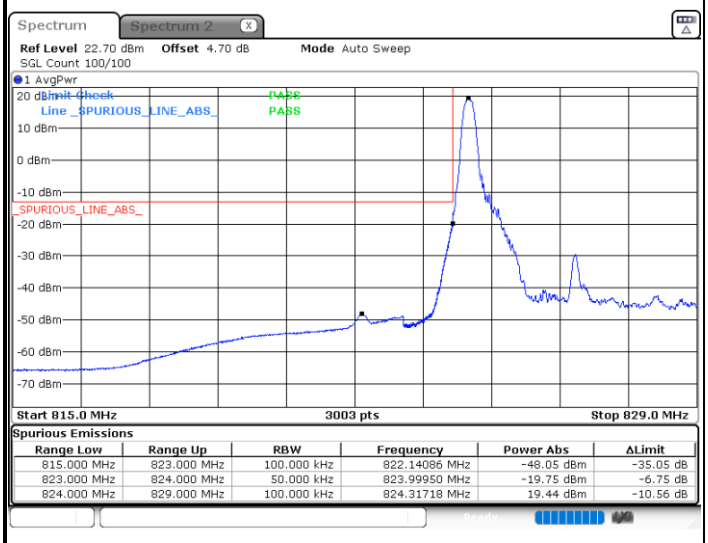
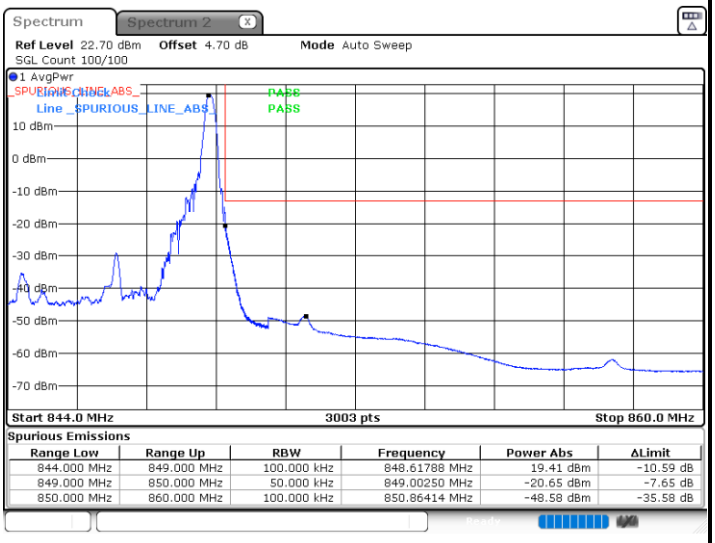
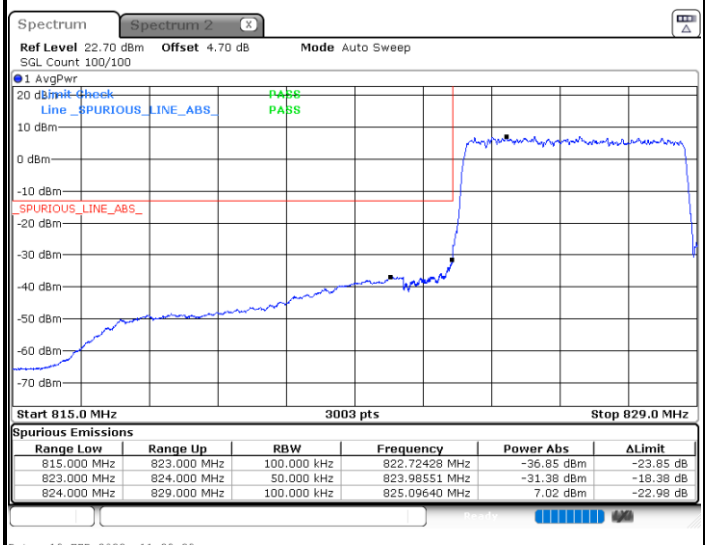
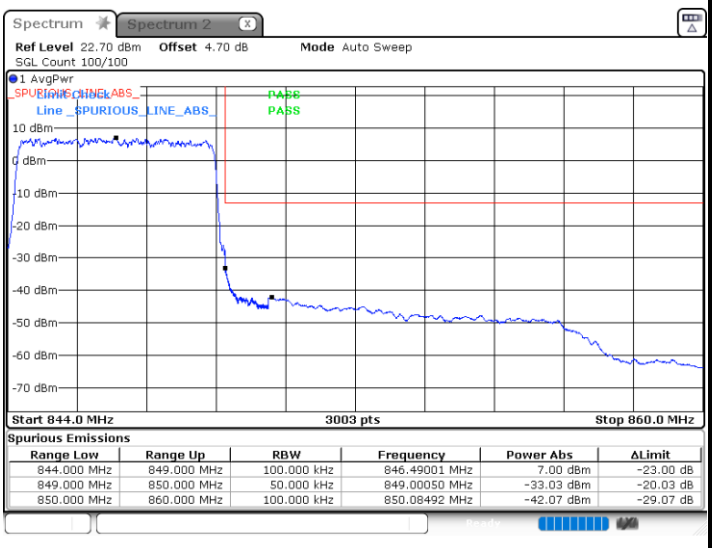
Highest Band Edge / Full RB

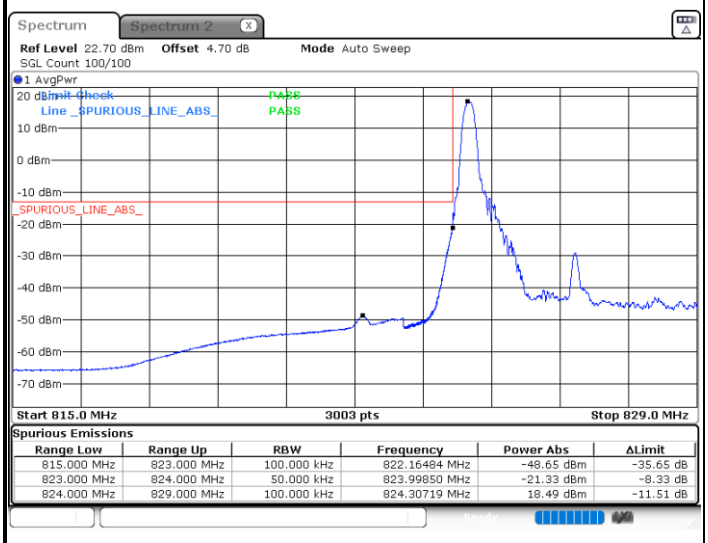
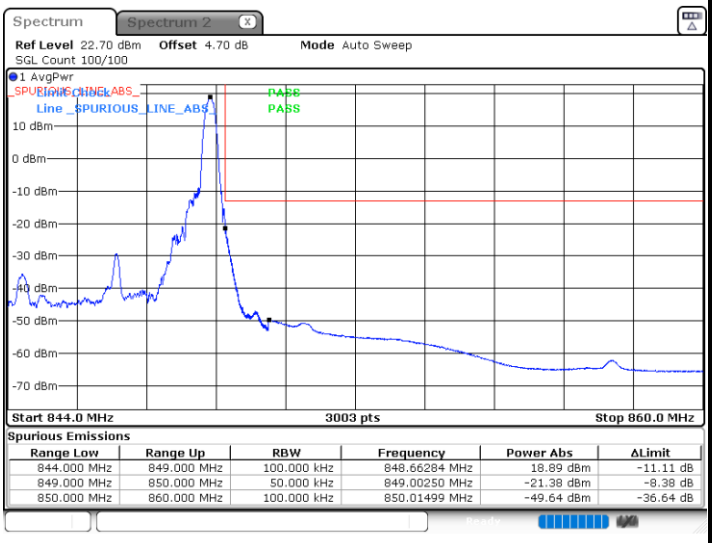
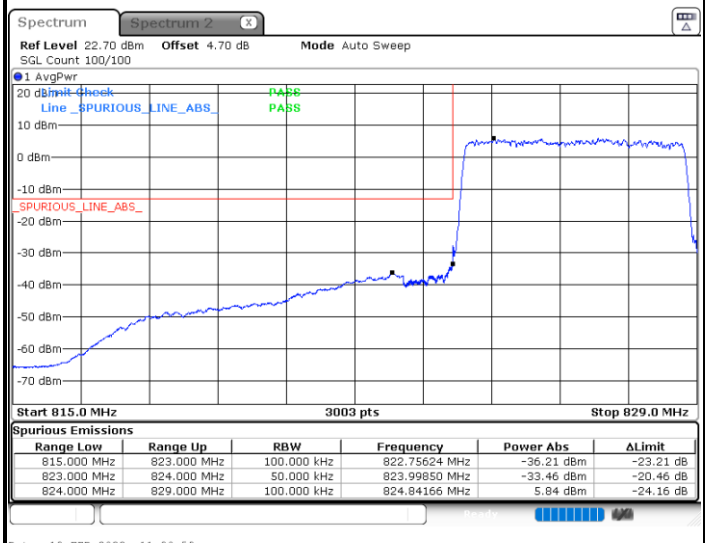
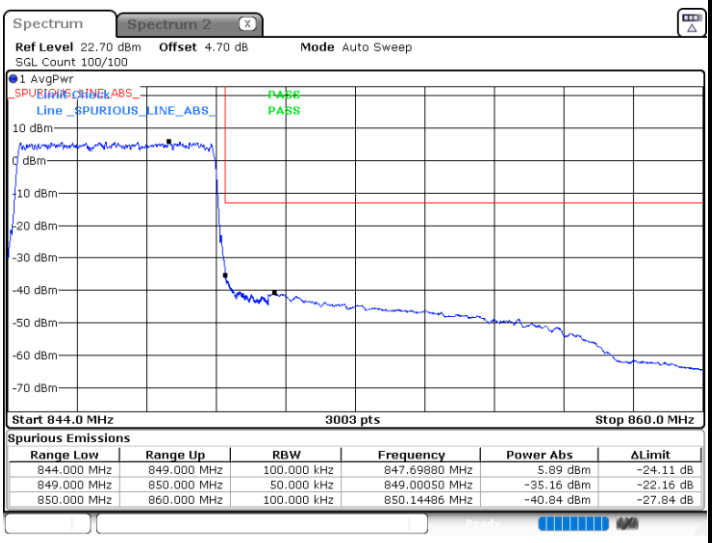


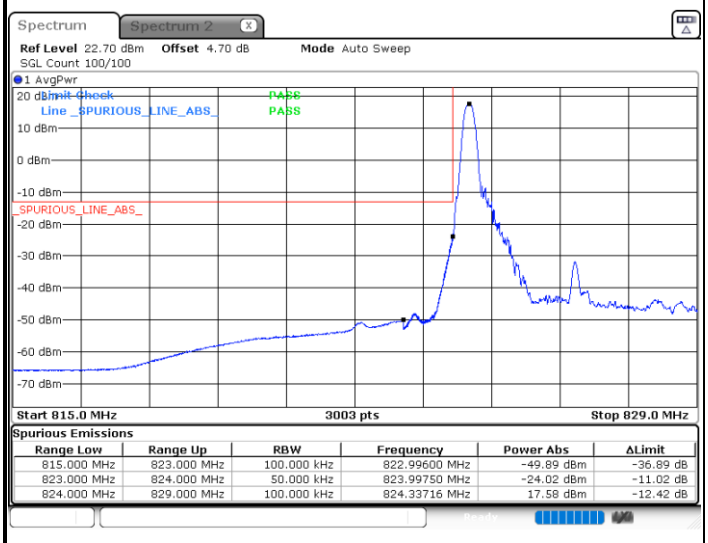
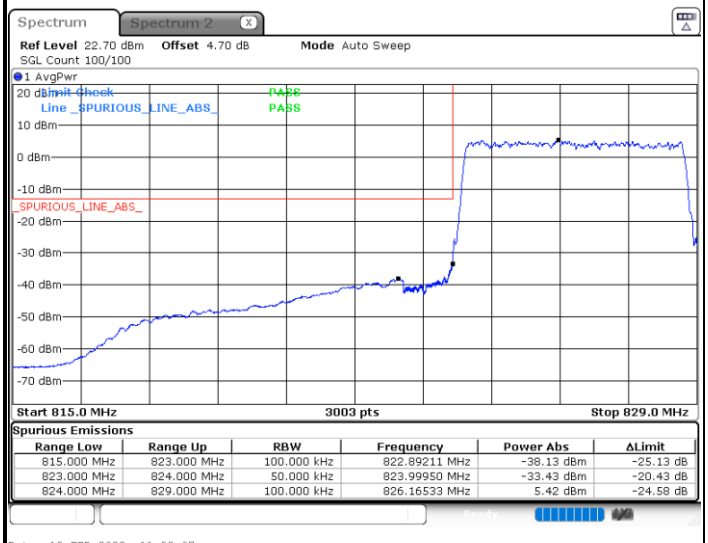
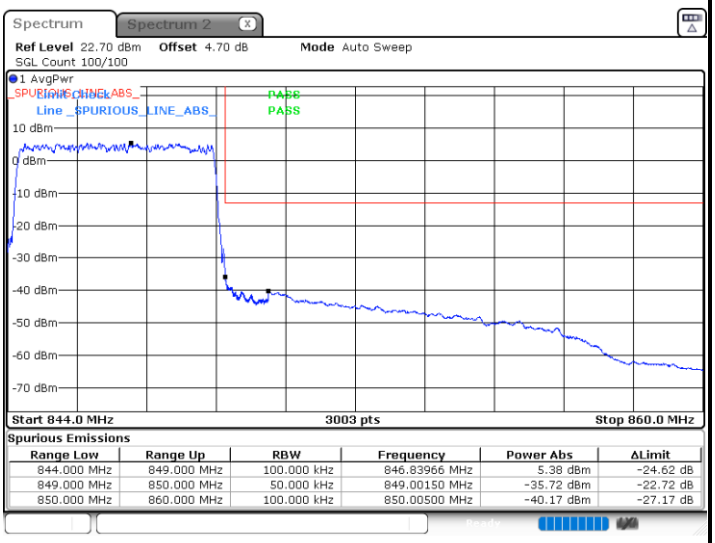
Spurious Emissions

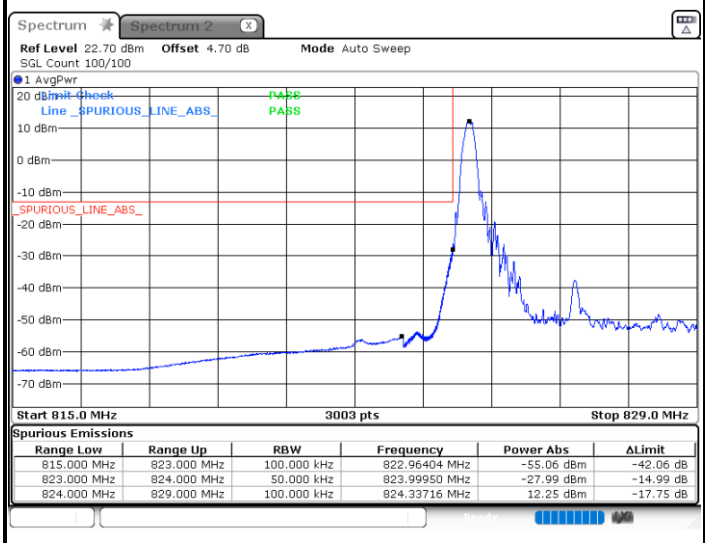
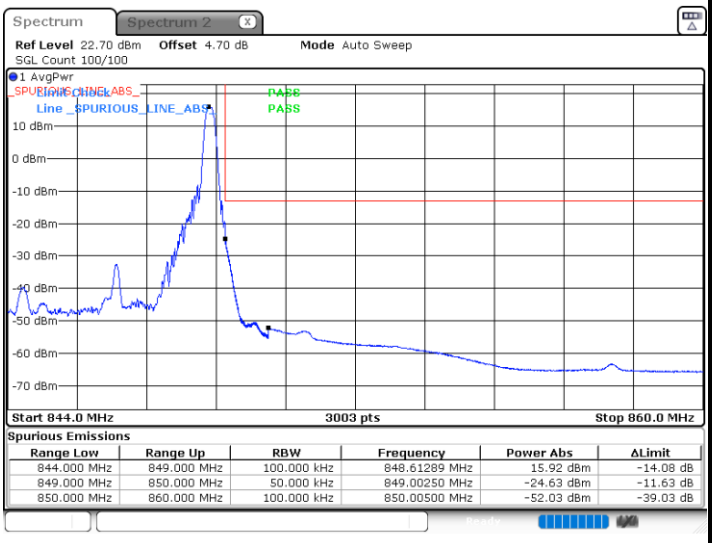
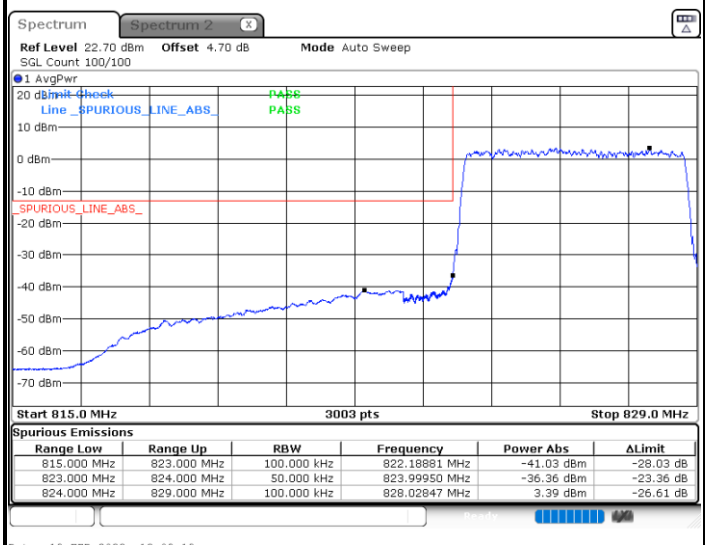
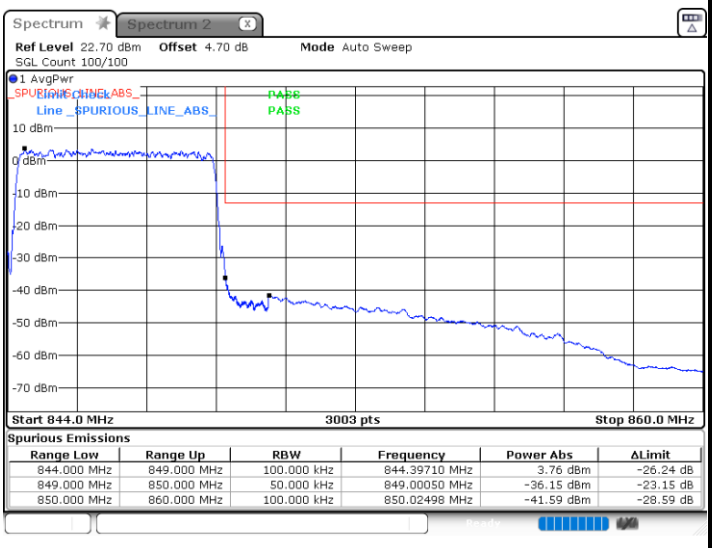
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	846.66983 MHz	6.44 dBm	-23.56 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.00250 MHz	-35.14 dBm	-22.14 dB
850.000 MHz	860.000 MHz	100.000 kHz	850.89411 MHz	-44.83 dBm	-31.83 dB

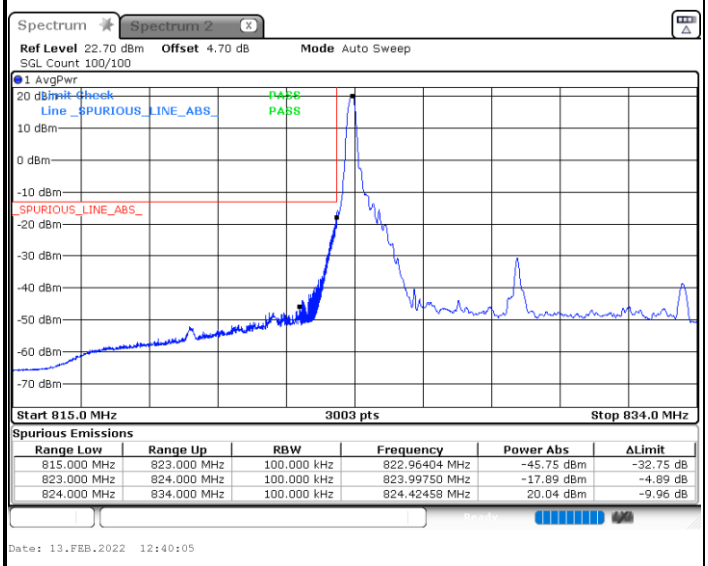
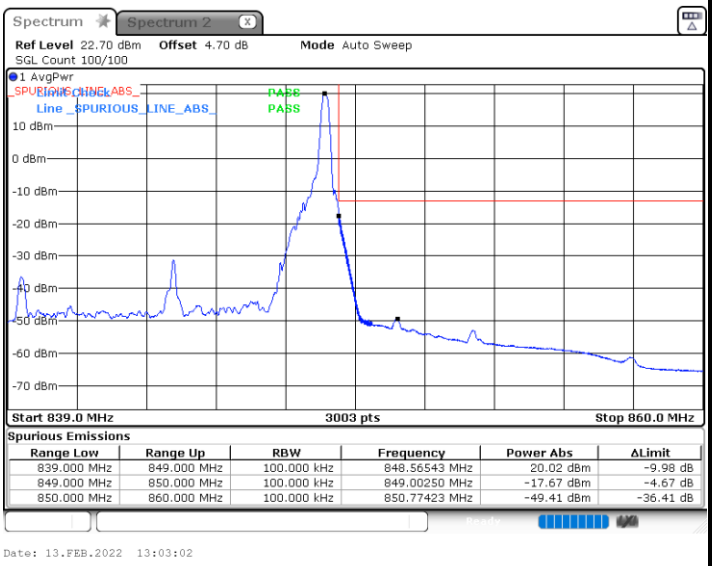
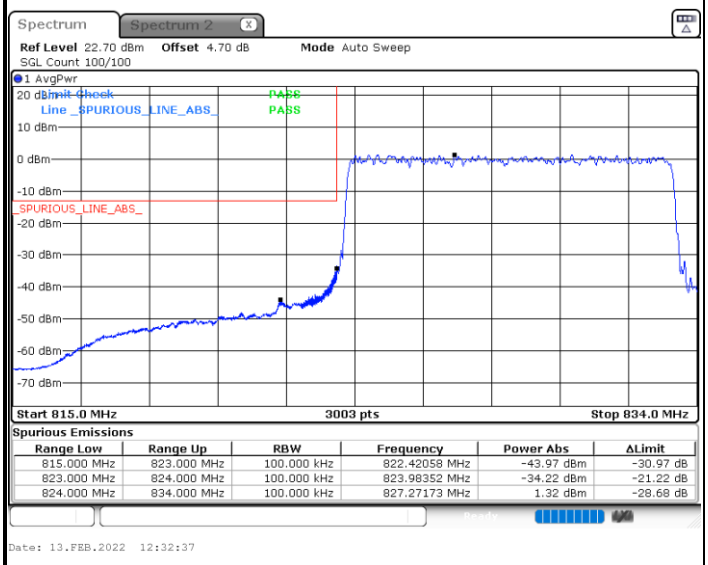
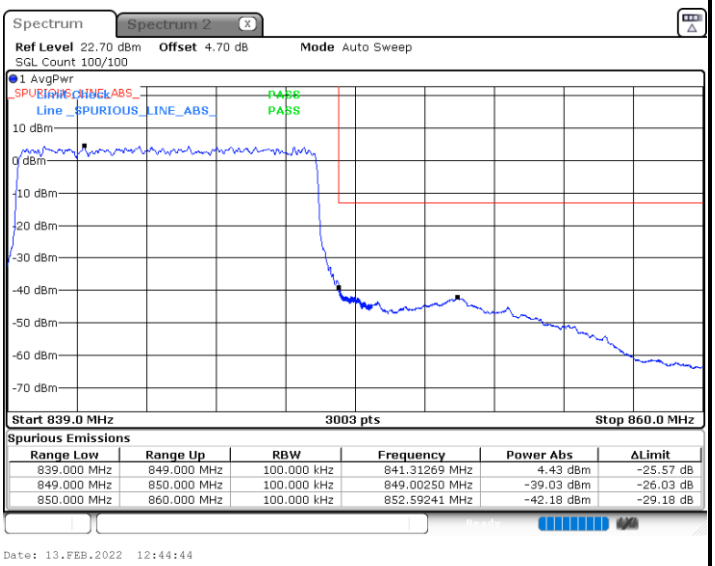
Date: 13.FEB.2022 12:18:06

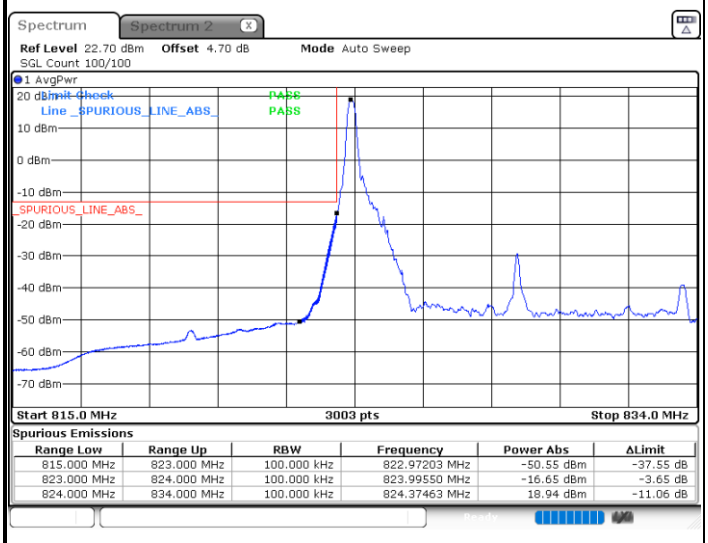
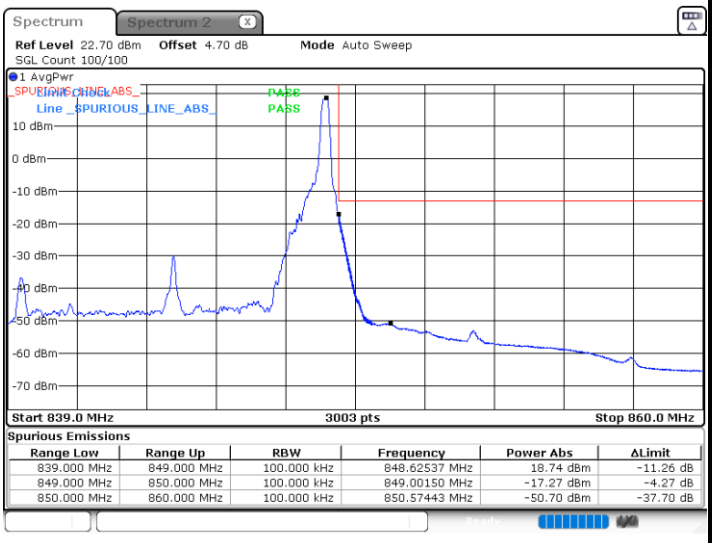
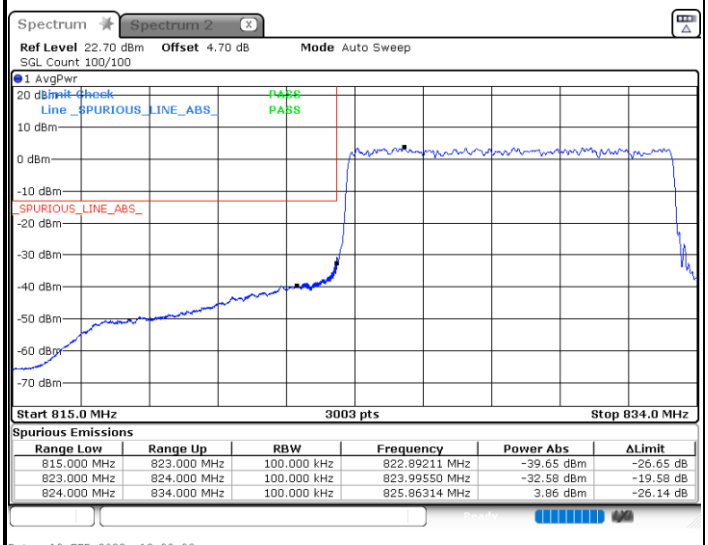
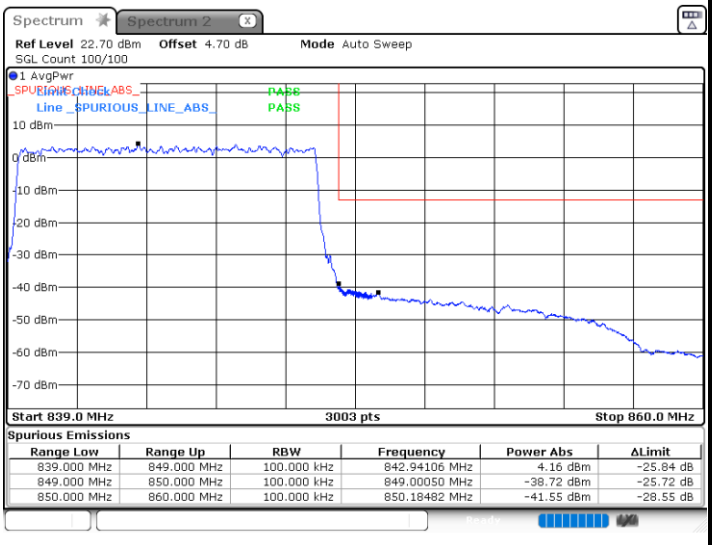
FR1 n5 / 5MHz / DFT-S OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

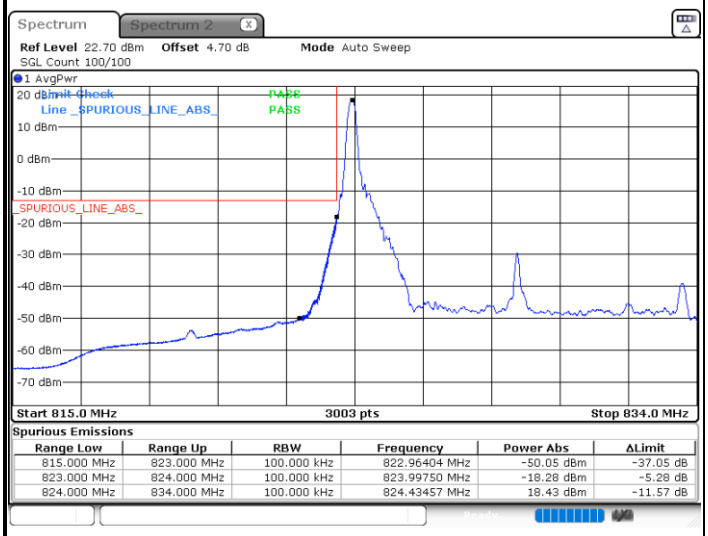
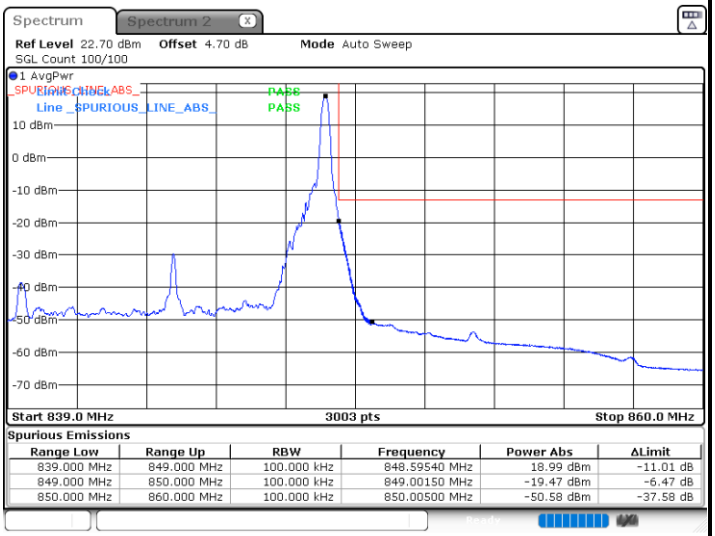
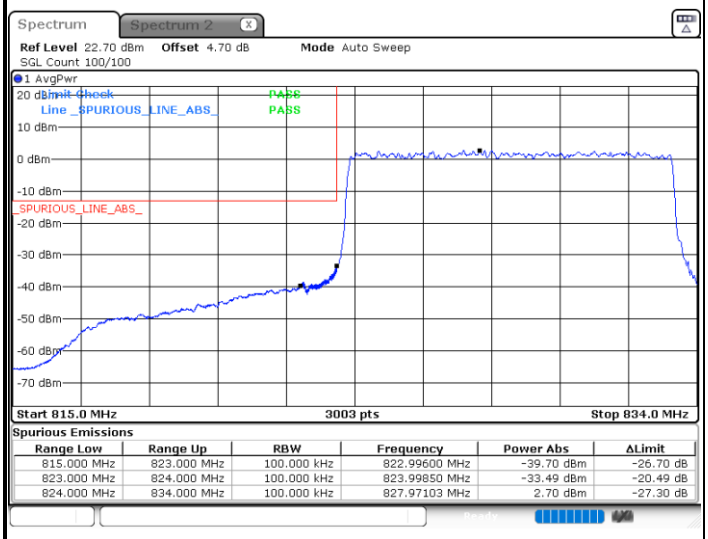
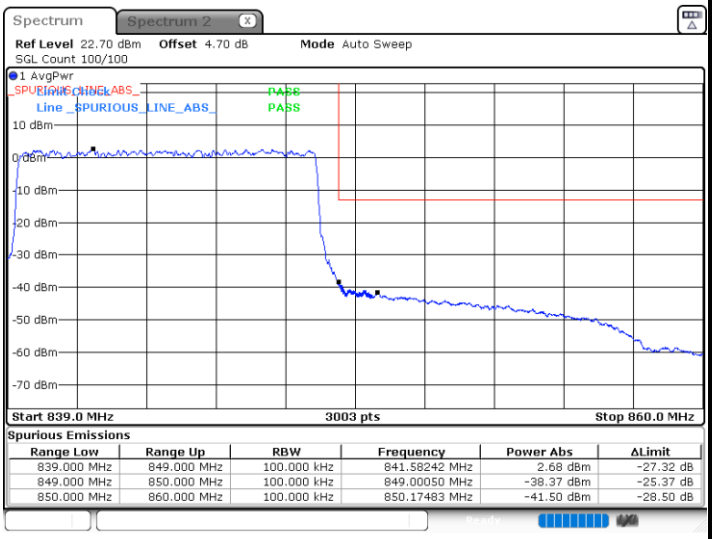
FR1 n5 / 5MHz / DFT-S OFDM / 16Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

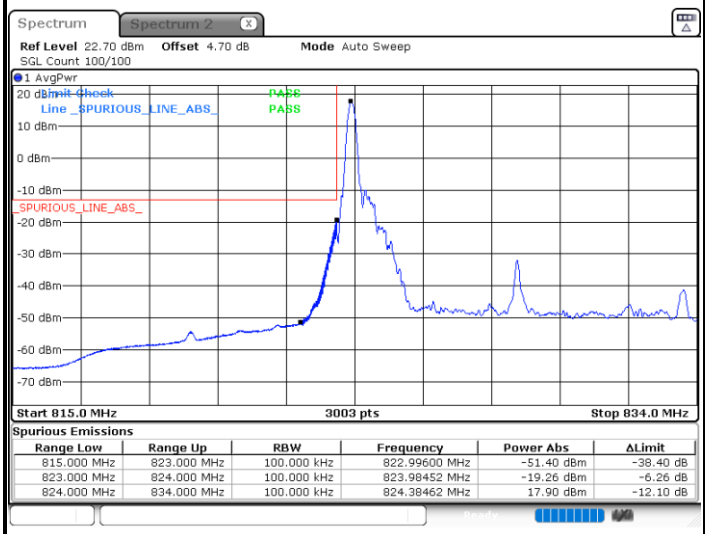
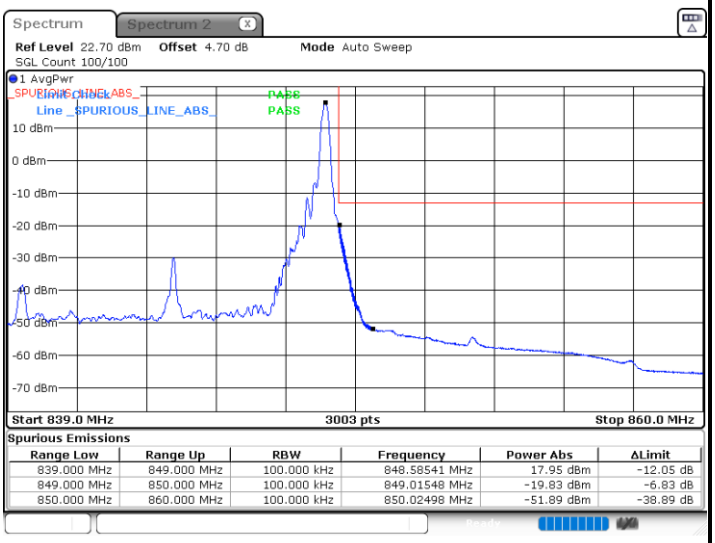
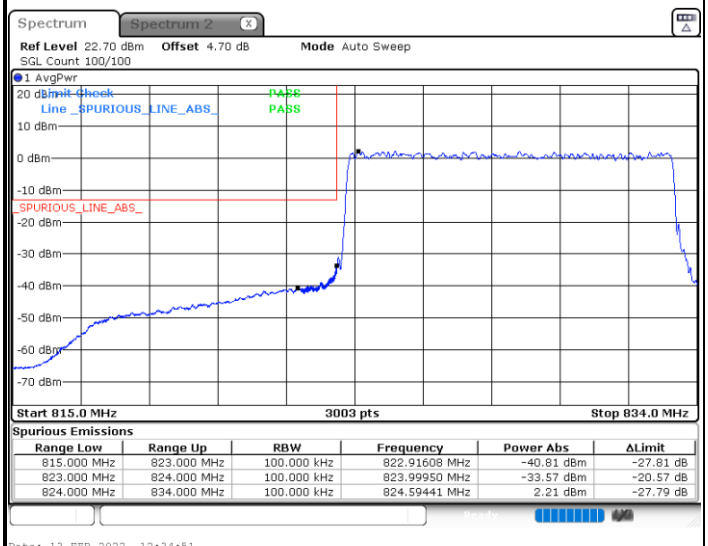
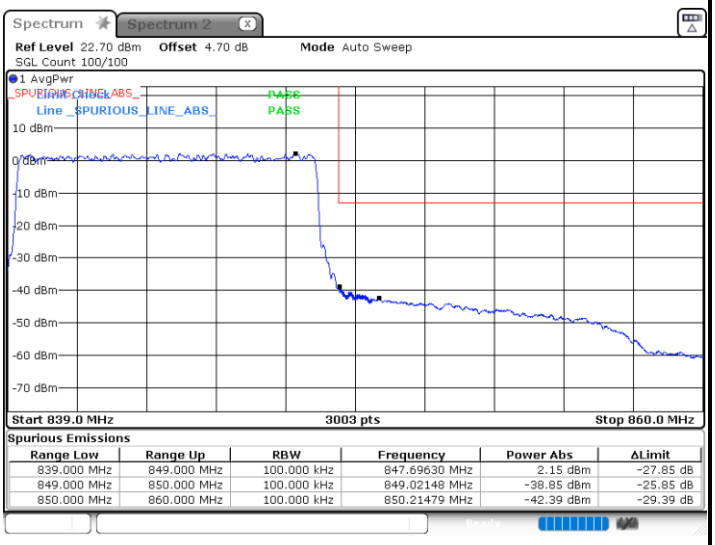
FR1 n5/ 5MHz / DFT-S OFDM / 64Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

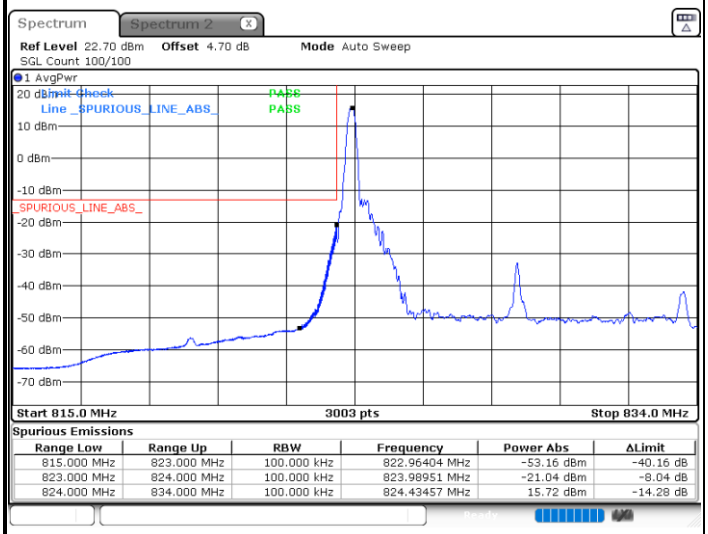
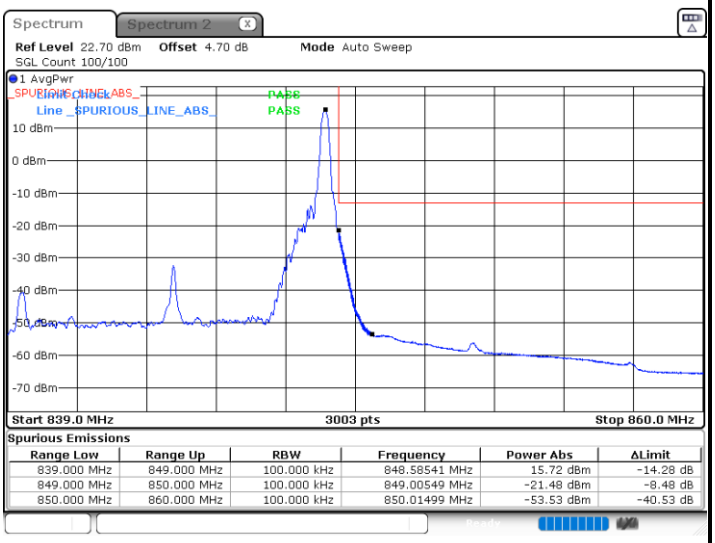
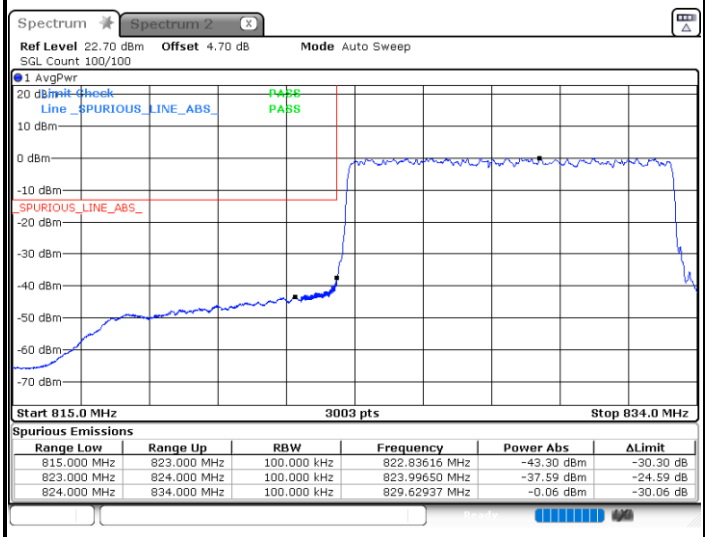
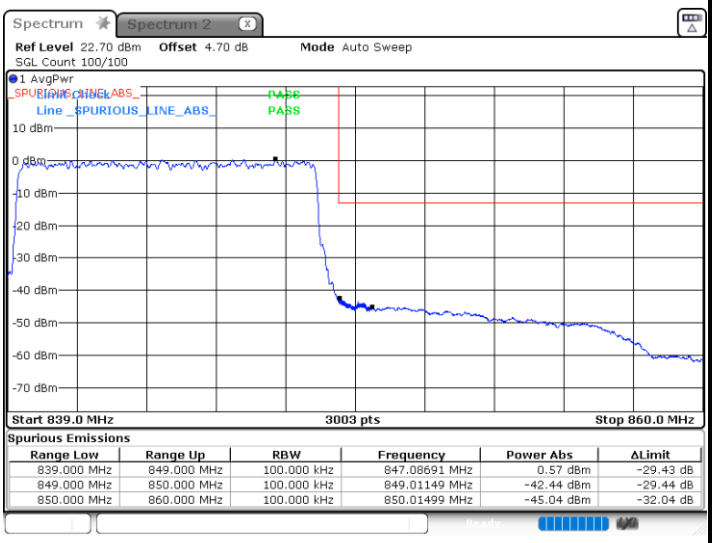
FR1 n5 / 5MHz / DFT-S OFDM / 256Q	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

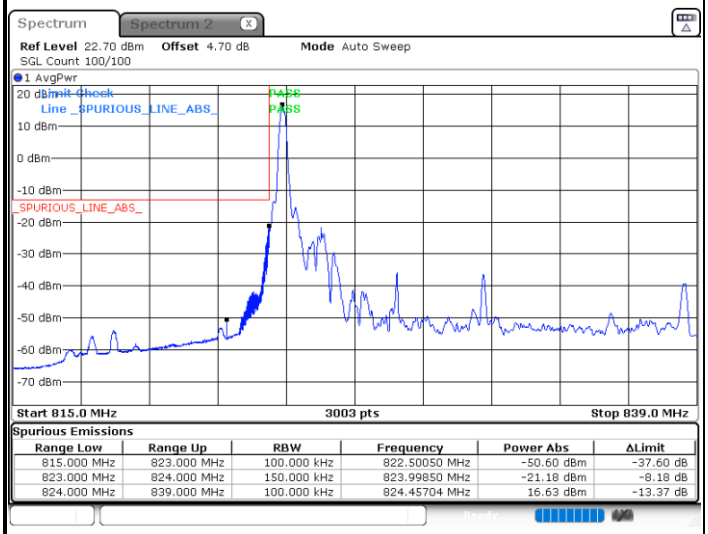
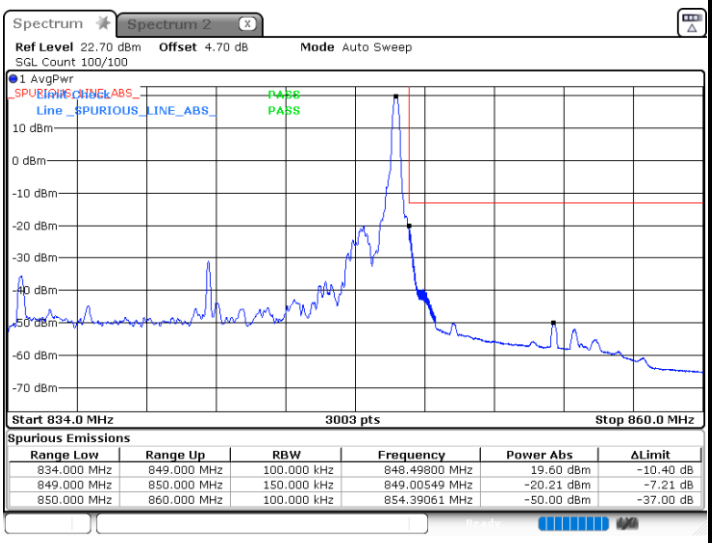
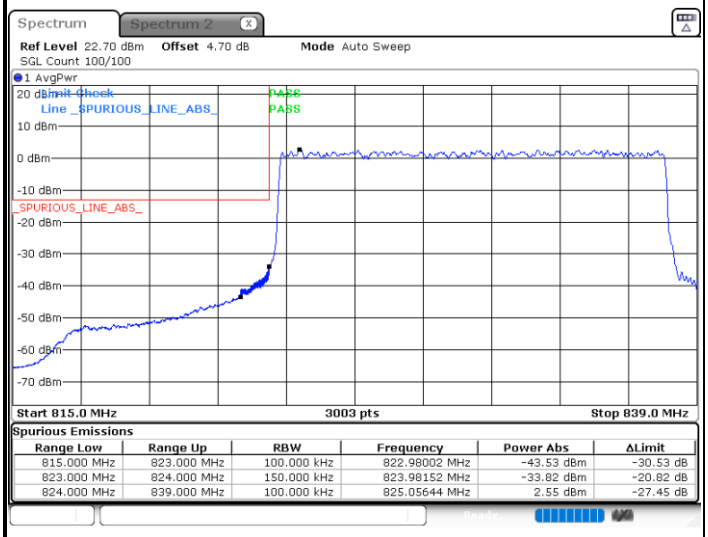
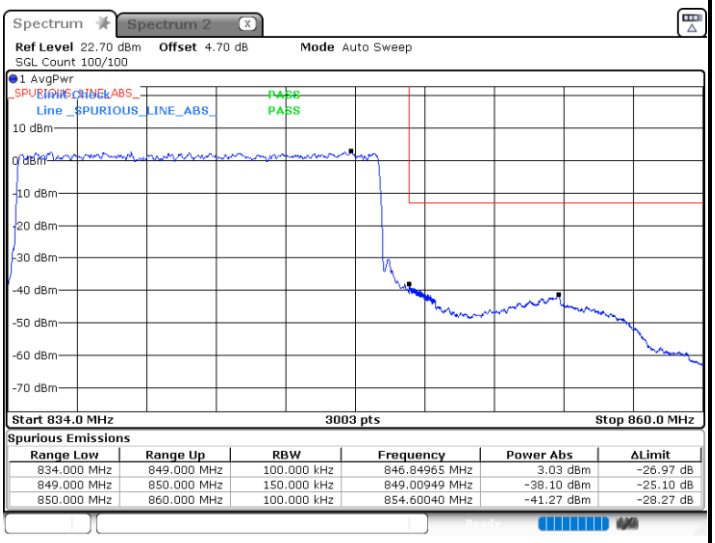
FR1 n5 / 10MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

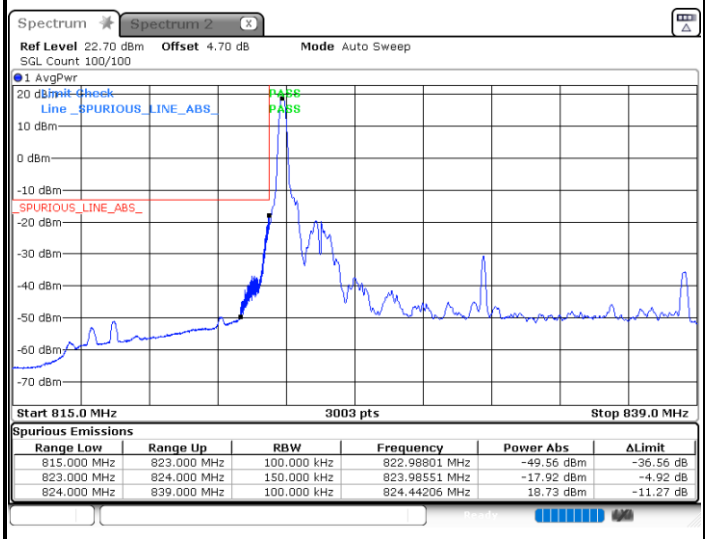
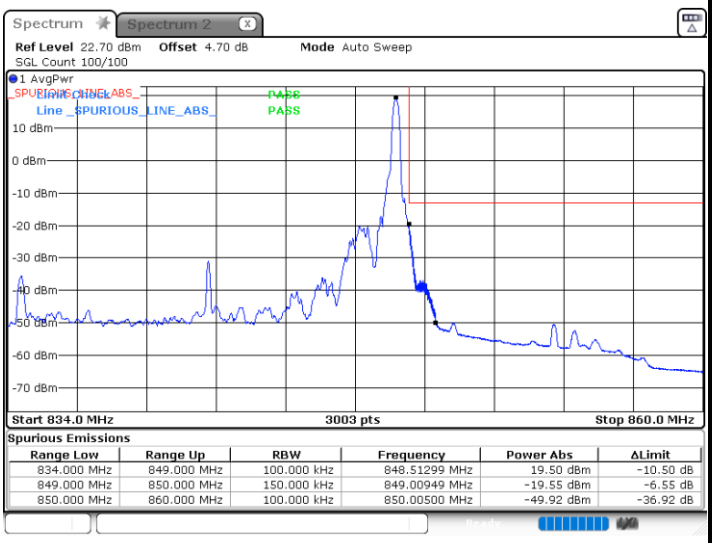
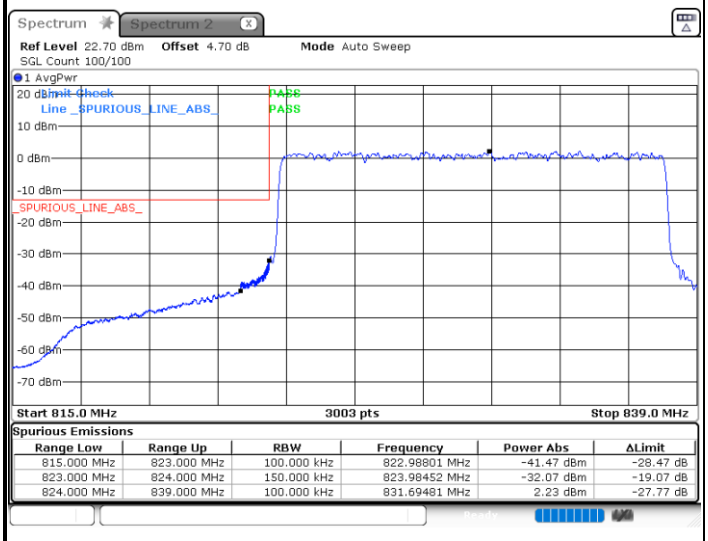
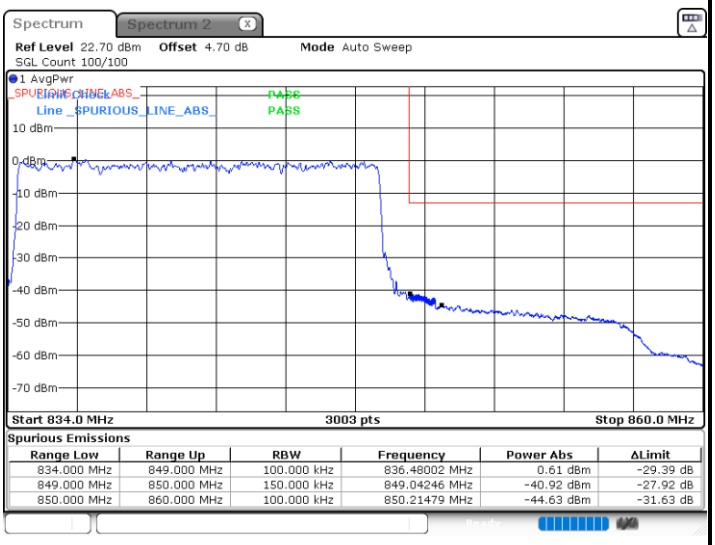
FR1 n5 / 10MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

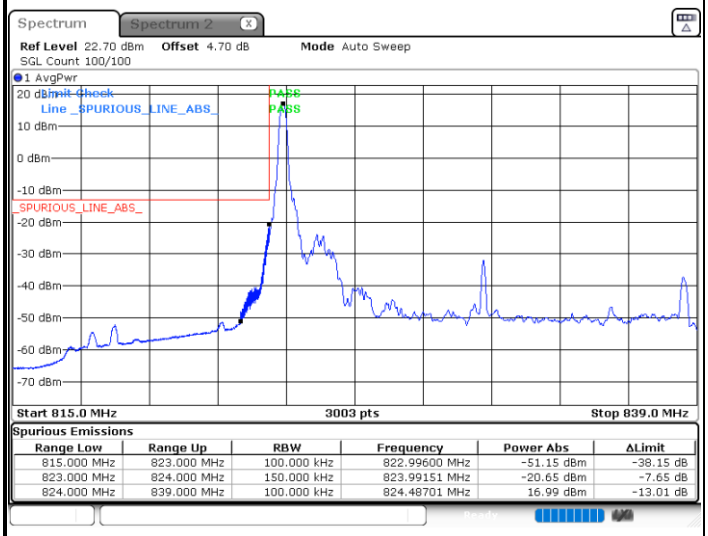
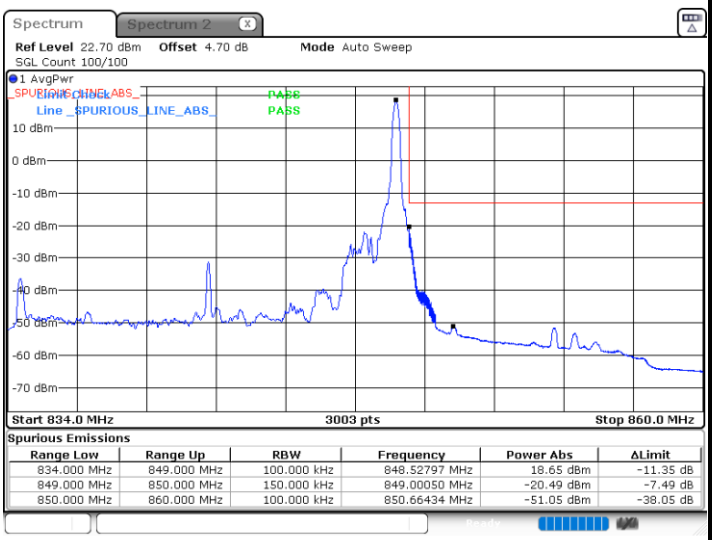
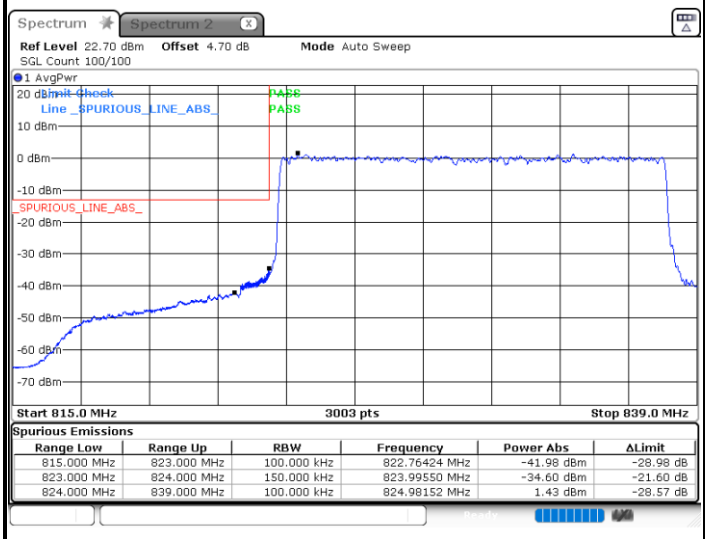
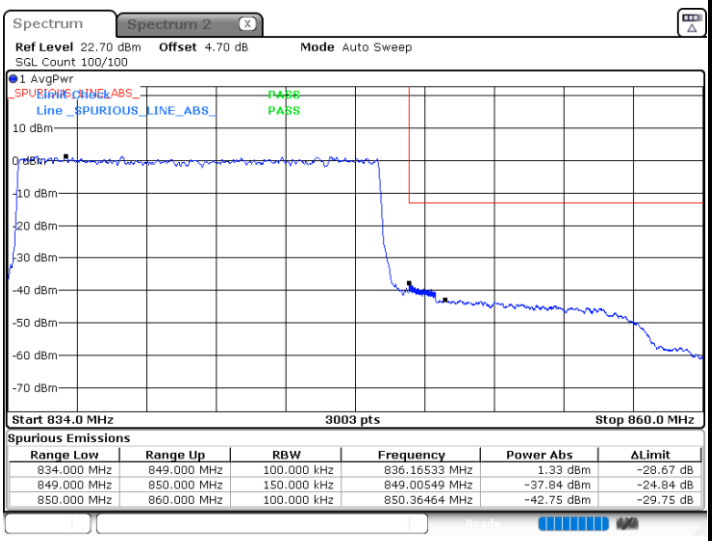
FR1 n5/ 10MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 10MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 10MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

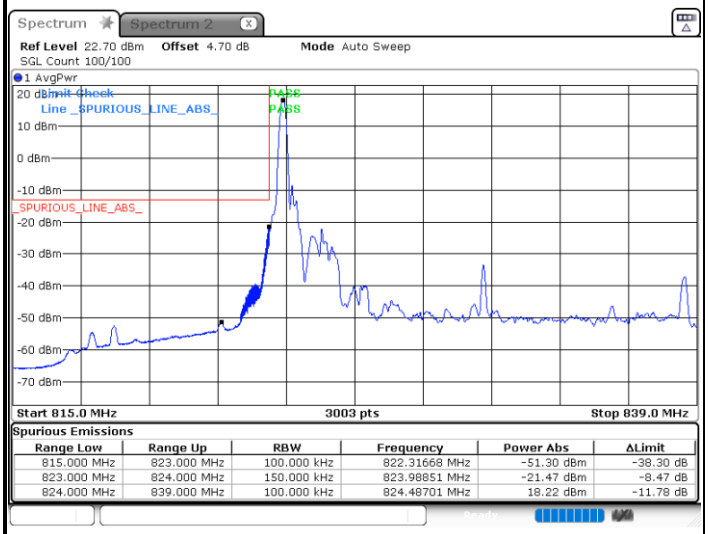
FR1 n5 / 15MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5/ 15MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 15MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 15MHz / DFT-s-OFDM / 64QAM

Lowest Band Edge / 1RB0

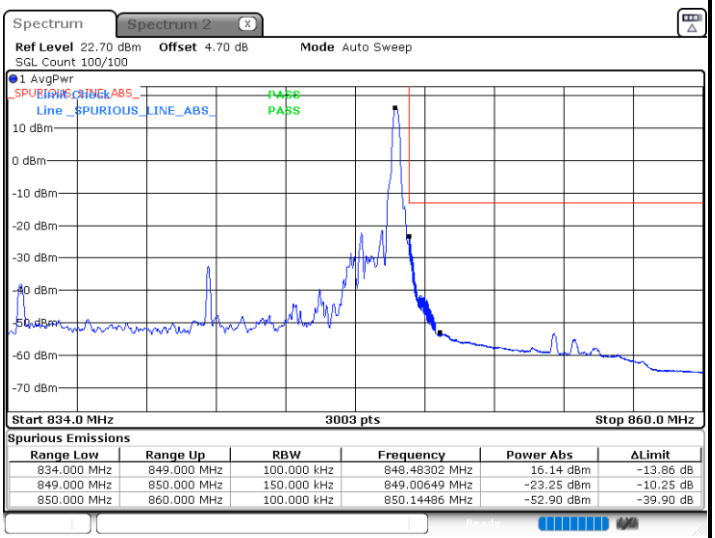


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
815.000 MHz	823.000 MHz	100.000 kHz	822.31668 MHz	-51.30 dBm	-38.30 dB
823.000 MHz	824.000 MHz	150.000 kHz	823.98851 MHz	-21.47 dBm	-8.47 dB
824.000 MHz	839.000 MHz	100.000 kHz	824.48701 MHz	18.22 dBm	-11.78 dB

Date: 13.FEB.2022 13:12:27

Highest Band Edge / 1RBMAX

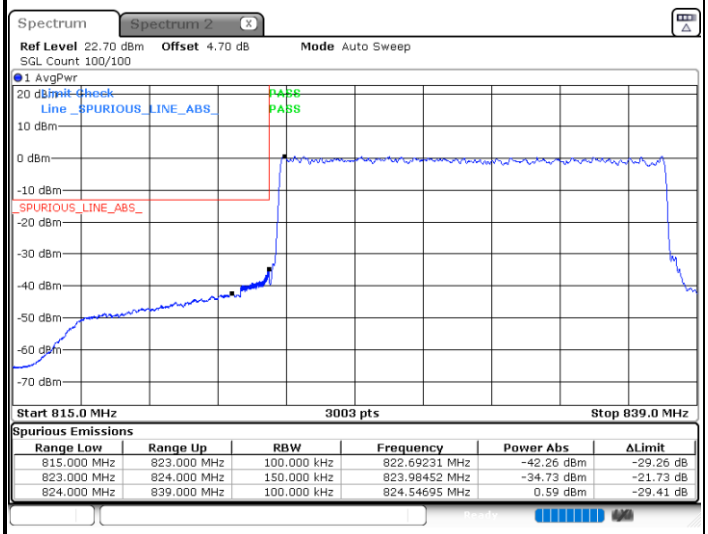


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
834.000 MHz	849.000 MHz	100.000 kHz	848.48302 MHz	16.14 dBm	-13.86 dB
849.000 MHz	850.000 MHz	150.000 kHz	849.00649 MHz	-23.25 dBm	-10.25 dB
850.000 MHz	860.000 MHz	100.000 kHz	850.14486 MHz	-52.90 dBm	-39.90 dB

Date: 13.FEB.2022 13:26:42

Lowest Band Edge / Full RB

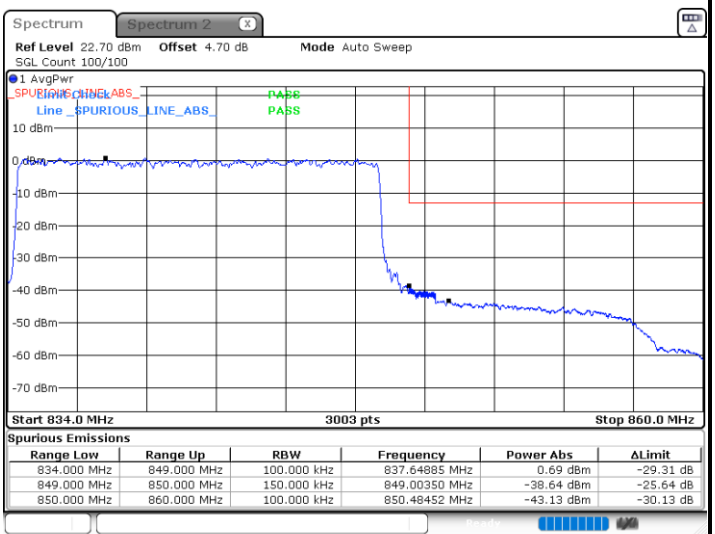


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
815.000 MHz	823.000 MHz	100.000 kHz	822.69231 MHz	-42.26 dBm	-29.26 dB
823.000 MHz	824.000 MHz	150.000 kHz	823.98452 MHz	-34.73 dBm	-21.73 dB
824.000 MHz	839.000 MHz	100.000 kHz	824.54695 MHz	0.59 dBm	-29.41 dB

Date: 13.FEB.2022 13:07:51

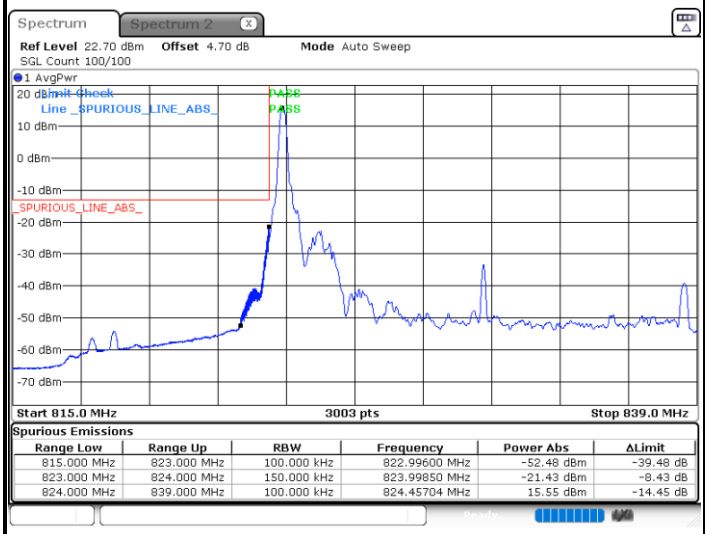
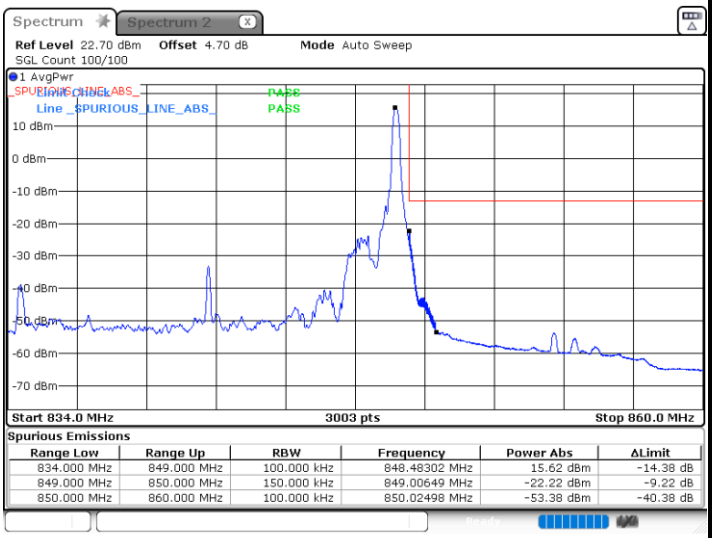
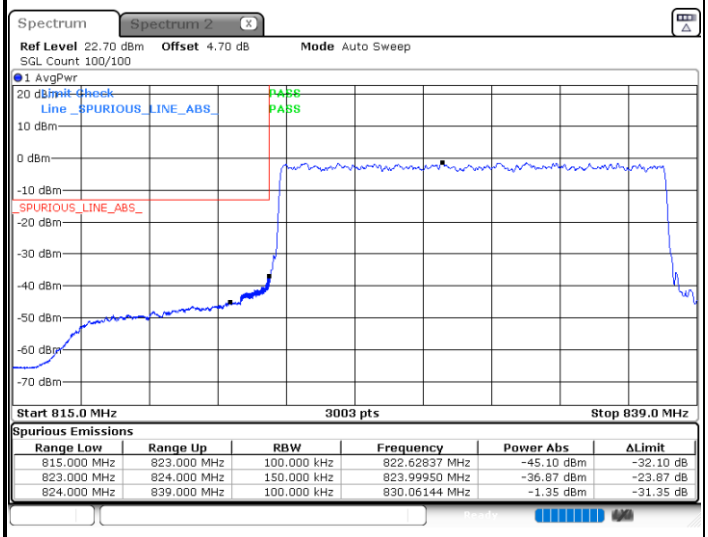
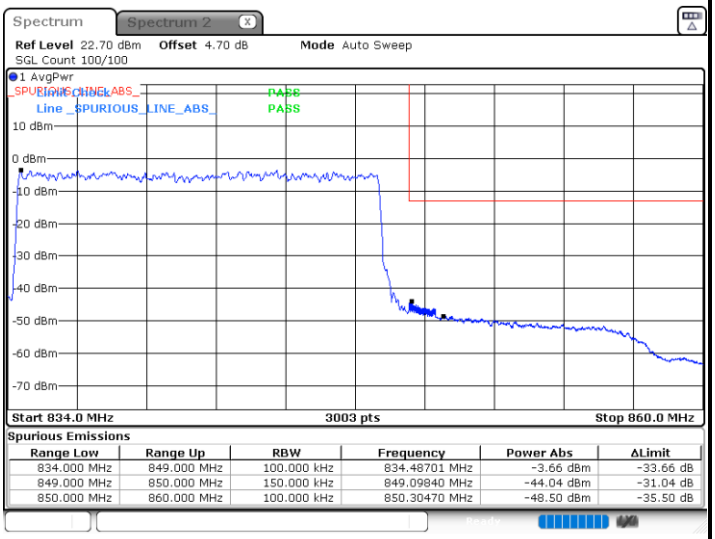
Highest Band Edge / Full RB



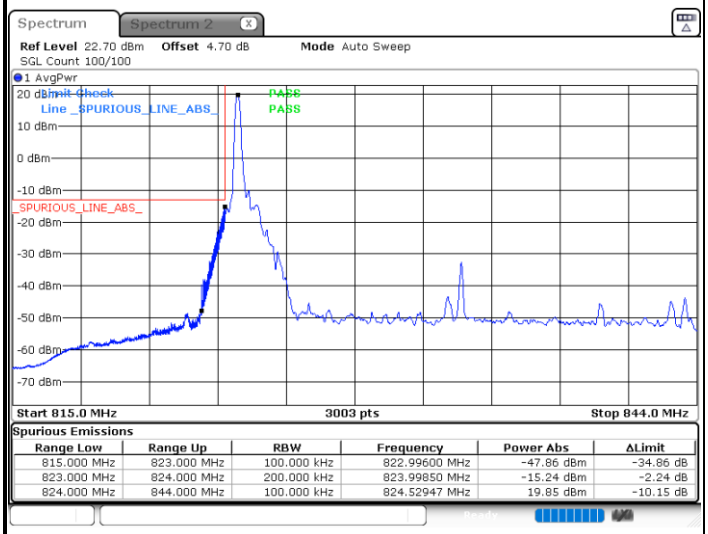
Spurious Emissions

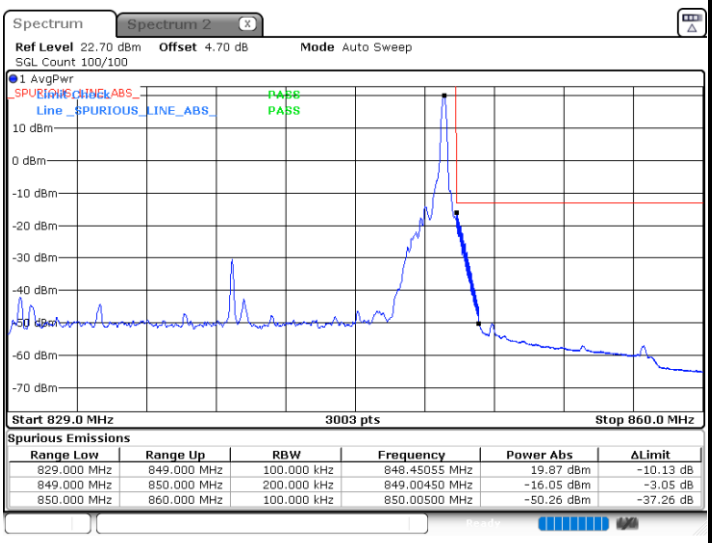
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
834.000 MHz	849.000 MHz	100.000 kHz	837.64885 MHz	0.69 dBm	-29.31 dB
849.000 MHz	850.000 MHz	150.000 kHz	849.00350 MHz	-38.64 dBm	-25.64 dB
850.000 MHz	860.000 MHz	100.000 kHz	850.48452 MHz	-43.13 dBm	-30.13 dB

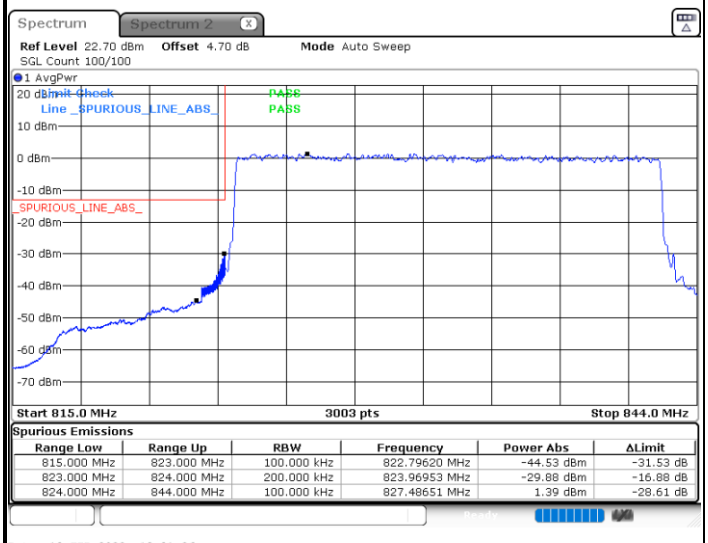
Date: 13.FEB.2022 13:24:18

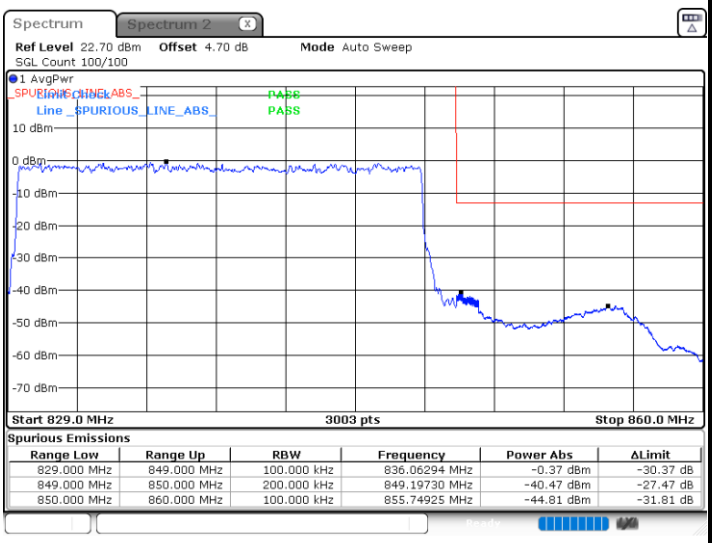
FR1 n5/ 15MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

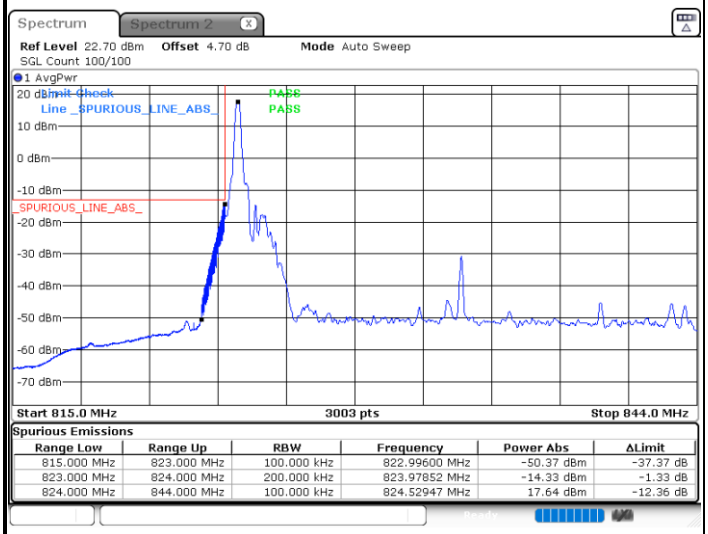
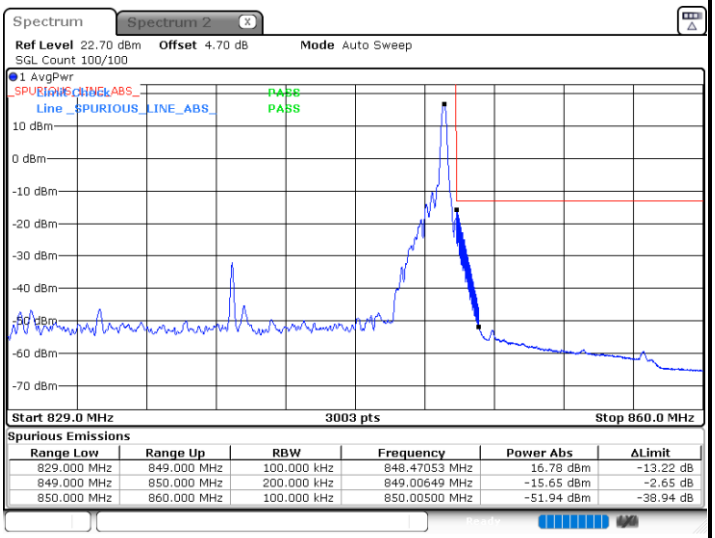
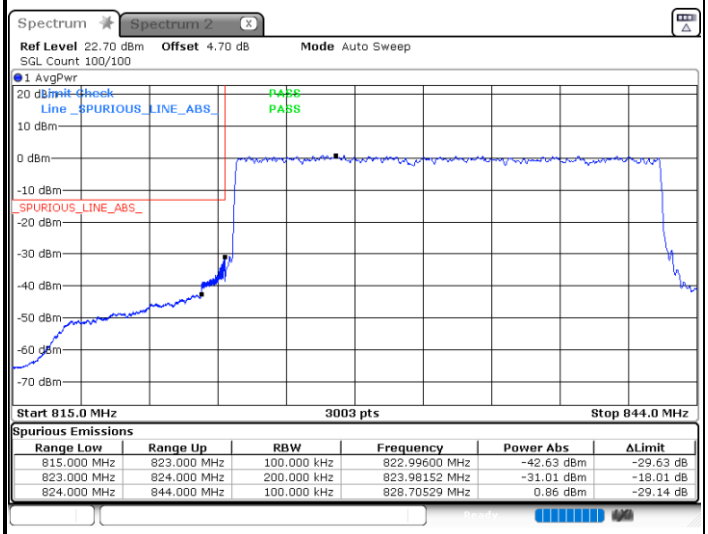
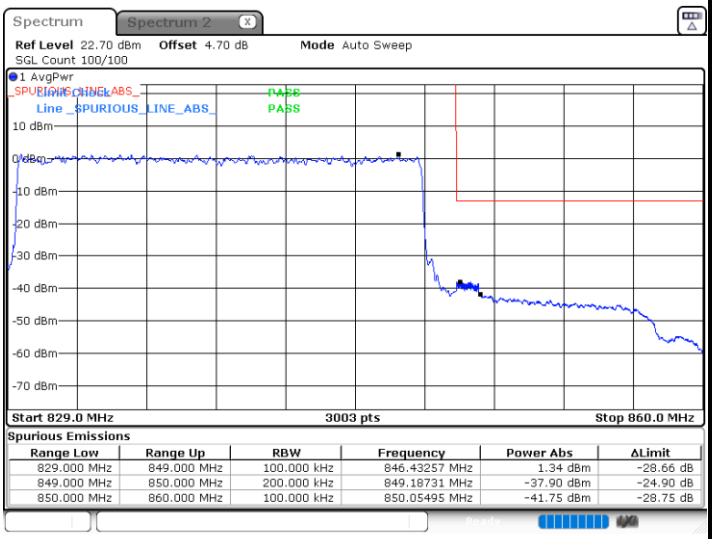
FR1 n5 / 20MHz / DFT-s-OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**

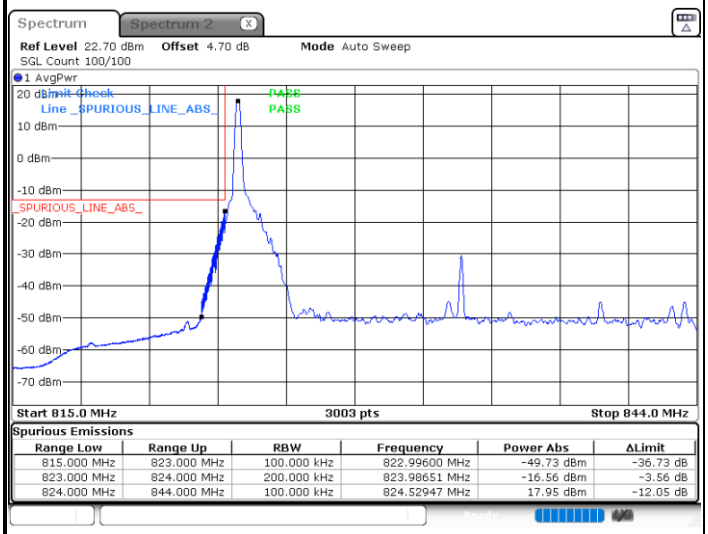
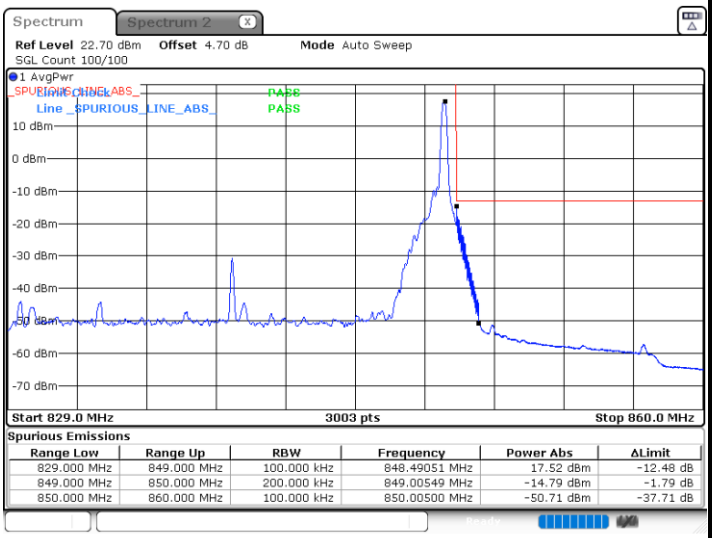
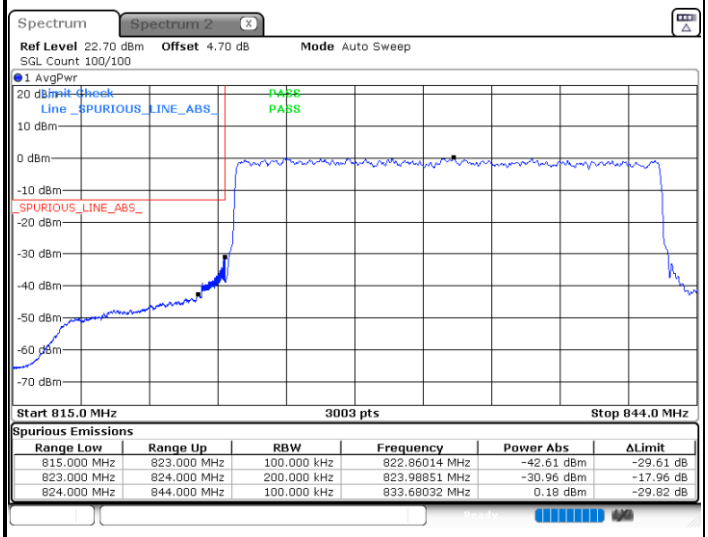
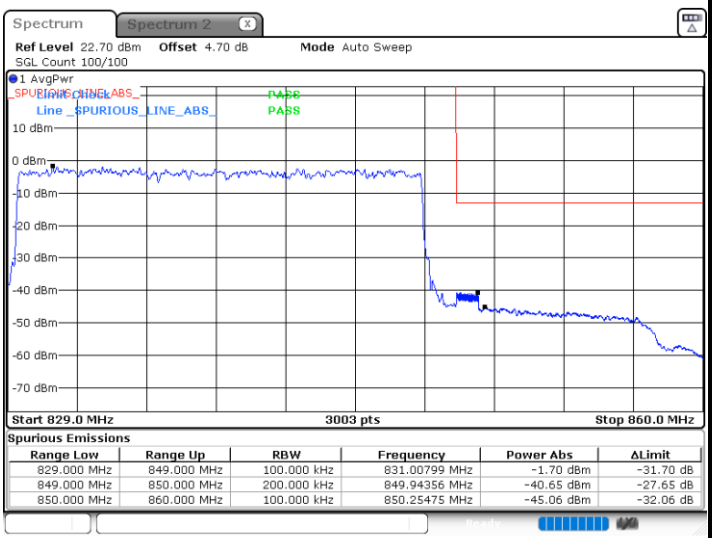


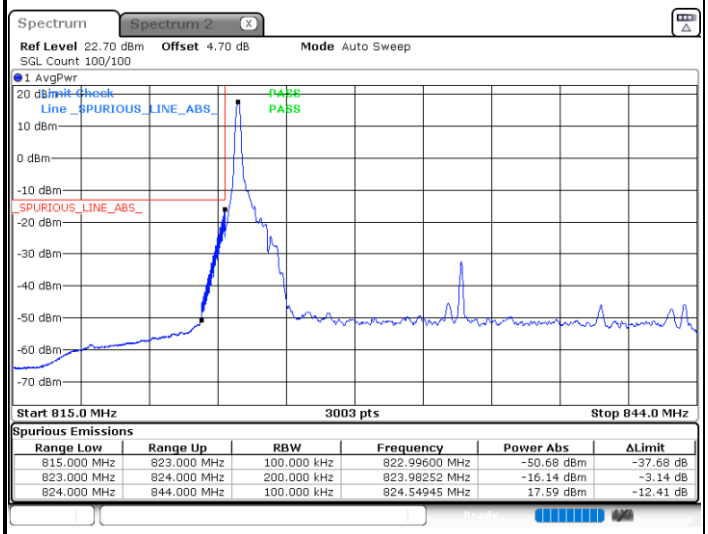
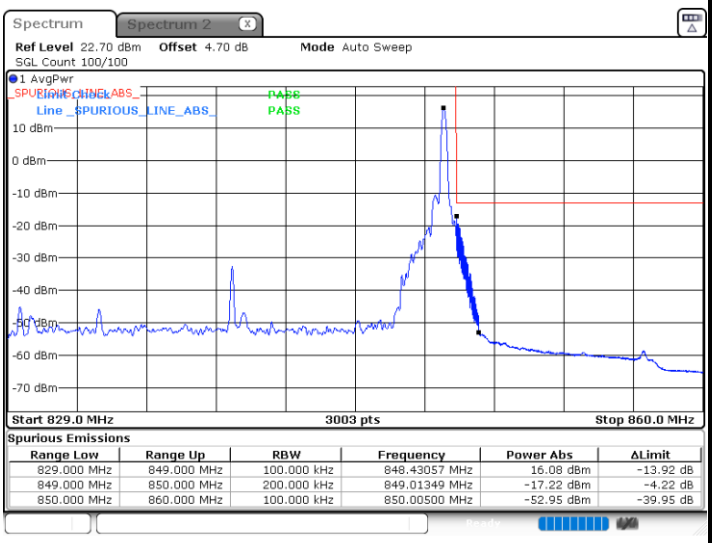
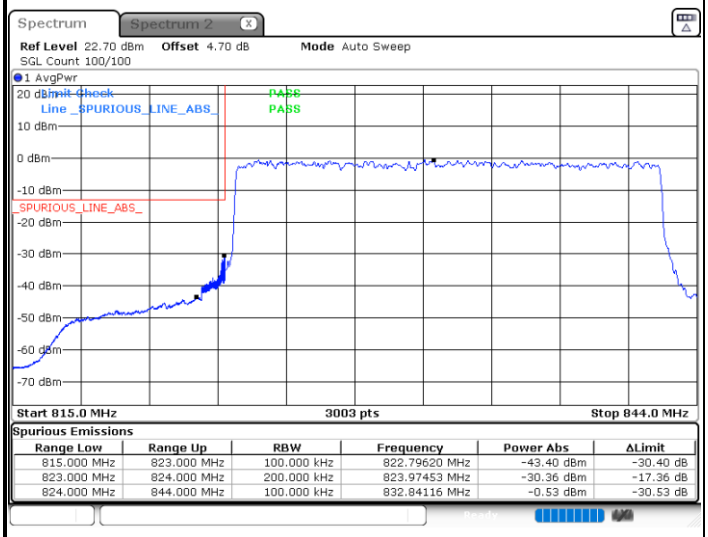
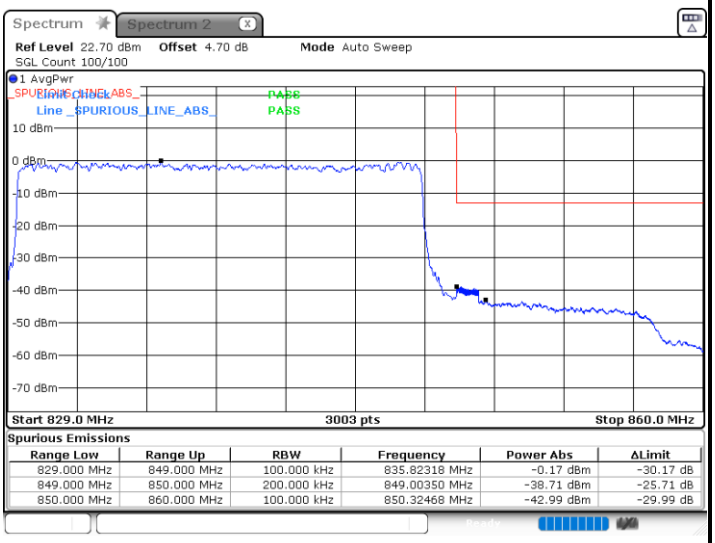


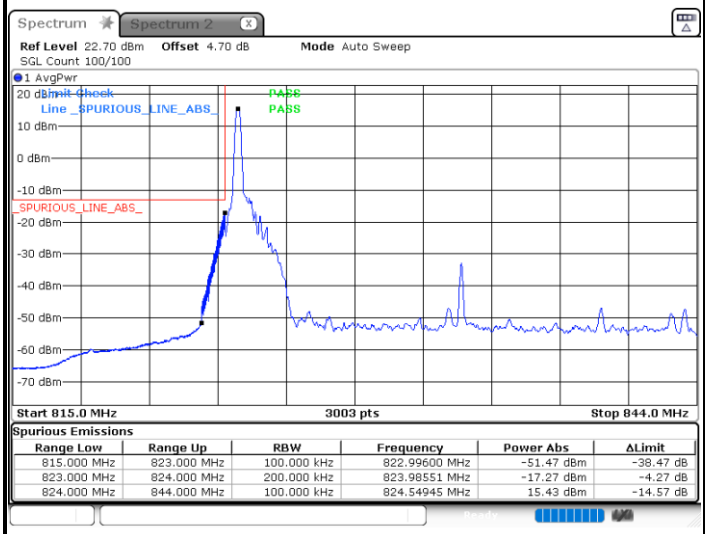
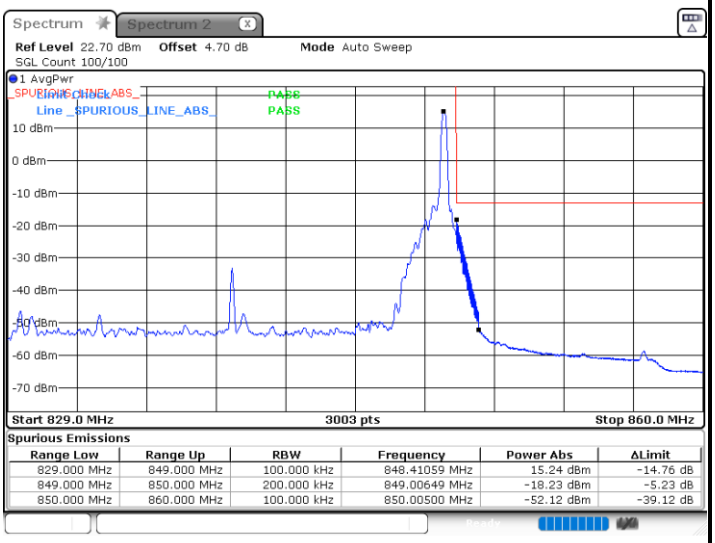




FR1 n5/ 20MHz / DFT-s-OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 20MHz / DFT-s-OFDM / 16QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5 / 20MHz / DFT-s-OFDM / 64QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

FR1 n5/ 20MHz / DFT-s-OFDM / 256QAM	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBMAX**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**